

REPORT
OF THE
HEALTH DEPARTMENT
OF
THE PANAMA CANAL
FOR THE
CALENDAR YEAR
1921

H. C. FISHER

Colonel, Medical Corps, United States Army
Chief Health Officer

Gift of the Panama Canal Museum

THE PANAMA CANAL PRESS
MOUNT HOPE, C. Z.
1922

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For additional copies of this publication address The Panama Canal, Washington, D. C., or Balboa Heights, Canal Zone.

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HEALTH DEPARTMENT.

OPERATION.

Operating under the direction of the Governor, of The Panama Canal. Maintained from funds designated for sanitation in Panama Canal appropriations and revenues derived from its own operations. It exercises jurisdiction in health matters over the Canal Zone and the cities of Panama and Colon, Republic of Panama, and also cooperates with the Panamanian Government in health matters in other parts of the Republic.

LETTER OF TRANSMITTAL.

THE PANAMA CANAL,
HEALTH DEPARTMENT,
BALBOA HEIGHTS, C. Z., March 16, 1922.

Col. JAY J. MORROW,
*Governor, The Panama Canal,
Balboa Heights, Canal Zone.*

SIR: I have the honor to submit the following report of the operations of the health department for the year 1921.

Respectfully,

H. C. FISHER,
Chief Health Officer.

ORGANIZATION.

The organization of the health department consists of:

Chief Health Office, Balboa Heights.

Division of Hospitals and Charities—

Ancon Hospital, Ancon.

Colon Hospital, Colon.

Corozal Hospital, Corozal.

Santo Tomas Hospital, Panama, R. P.

Palo Seco Leper Colony.

Dispensaries at—

Colon Hospital.

Gatun.

Pedro Miguel.

Ancon Hospital.

Balboa.

District Dentists at—

Colon.

Gatun.

Pedro Miguel.

Ancon.

Balboa.

La Boca.

Division of Sanitation—

Health Office, Panama.

Health Office, Colon.

Sanitary Districts—

Northern District; Office, Gatun.

Southern District; Office, Ancon.

Ancon-Balboa District; Office, Balboa.

Division of Quarantine—

Chief Quarantine Office, Balboa Heights.

Quarantine Station, Colon.

Quarantine Station, Fort Amador.

PERSONNEL.

(December 31, 1921.)

CHIEF HEALTH OFFICE.

Balboa Heights.

Col. H. C. Fisher, U. S. Army, Chief Health Officer.
 Dr. D. P. Curry, Assistant Chief Health Officer.
 Mr. A. L. Fessler, Office Assistant.

DIVISION OF HOSPITALS AND CHARITIES.

Ancon Hospital.

Col. L. T. Hess, U. S. Army, Superintendent.
 Capt. James B. Anderson, U. S. Army, Assistant Superintendent.
 Dr. T. W. Earhart, Chief of Surgical Clinic.
 Dr. W. E. Hubbard, Assistant Chief of Surgical Clinic.
 Dr. R. C. Connor, Chief of Medical Clinic.
 Dr. W. W. Braithwaite, Assistant Chief of Medical Clinic.
 Dr. T. H. Odeneal, Chief of Eye and Ear Clinic.
 Dr. I. E. Hix, Assistant Chief of Eye and Ear Clinic.
 Dr. L. S. Townsend, Chief of X-Ray Clinic.

Physicians.

Dr. H. G. Hambleton.	Dr. C. D. Briscoe.
Dr. L. S. Chapman.	Dr. H. K. Tuttle.
Dr. D. L. Hollis.	Dr. P. G. Pomeroy.

Internes.

Dr. Claude M. Cleveland.	Dr. Victor J. Sprauer.
Dr. William W. Walker.	Dr. Otis A. Kopp.
Dr. George W. Owen.	Dr. Mallory A. Pittman.
Dr. Garwood C. Richardson.	

Board of Health Laboratory.

Dr. L. B. Bates, Chief of Laboratory.
 Dr. H. C. Clark, Pathologist.
 Capt. J. H. St. John, U. S. Army, Bacteriologist.
 Mr. J. E. Jacob, Chemist.

Corozal Hospital.

Dr. Louis Wender, *Superintendent.*
 Dr. D. G. O'Neil.
 Dr. D. G. Sampson.

Colon Hospital

Maj. T. J. Leary, U. S. Army, Superintendent

Physicians.

Dr. W. V. Levy.
 Dr. W. W. Cook.
 Dr. J. C. Scott.
 Dr. Wayne Gilder.

Internes.

Dr. Louis O. Thompson.
 Dr. William L. McNamara.
 Dr. Anthony Guijarro.

Santo Tomas Hospital (Panama).

Maj. E. A. Bocock, U. S. Army, Superintendent.

Physicians on Panama Canal Roll.

Dr. N. B. Kupfer.
 Dr. Roy R. Jones.
 Dr. L. W. Elston.

Palo Seco Leper Colony.

Mr. F. D. Tucker, Superintendent.
 Dr. Philip Horwitz, Visiting Physician.

Cristobal-Colon Dispensary.

Dr. W. V. Levy, District Physician.

Gatun Dispensary.

Dr. J. A. Grider, District Physician.

Pedro Miguel Dispensary.

Dr. W. B. Meares, District Physician.
 Dr. S. S. Irvin.

Balboa Dispensary.

Dr. J. S. Vance, District Physician.
 Dr. L. O. Keen.
 Dr. W. J. Burke.
 Dr. George Eugene.

Ancon Dispensary.

Dr. W. K. Olson, District Physician
 Dr. H. G. Bickford.

DIVISION OF SANITATION.

Panama Health Office.

Dr. Henry Goldthwaite, Health Officer.

Mr. J. M. Carpprow, Sanitary Inspector.
 Mr. C. L. Pierce, Sanitary Inspector.
 Mr. E. F. Quimby, Sanitary Inspector.
 Mr. O. W. Searcy, Sanitary Inspector.
 Dr. H. A. Lewis, Vaccinator.
 Dr. F. T. Eisenman, Veterinarian and Meat Inspector.
 Dr. F. F. Dowd, Veterinarian and Meat Inspector.

Colon Health Office.

Dr. J. L. BYRD, Health Officer

Mr. T. A. Leathley, Sanitary Inspector.
 Mr. I. W. Pickett, Sanitary Inspector.
 Mr. E. K. Turner, Sanitary Inspector.
 Dr. I. C. Mattatall, Supervising Veterinarian and Meat Inspector.
 Dr. W. F. Gross, Veterinarian and Meat Inspector.

Canal Zone Sanitation.

Mr. C. H. Bath, Sanitary Inspector, Northern District, Gatun.
 Mr. Geo. L. Willett, Sanitary Inspector, Southern District, Ancon.
 Mr. John P. Corrigan, Sanitary Inspector, Ancon-Balboa District, Balboa.
 Mr. J. L. Tolar, Sanitary Inspector (Relief), Pedro Miguel.

DIVISION OF QUARANTINE.

Chief Quarantine Office

Balboa Heights.

Surgeon W. C. Rucker, U. S. P. H. S., Chief Quarantine Officer.

Cristobal-Colon Quarantine, Cristobal, C. Z.

Dr. C. A. Hearne, Quarantine Officer.
 Dr. E. T. Lake.
 Dr. E. W. Torrey.
 Dr. F. L. Alexaitis.

Balboa-Panama Quarantine, Fort Amador, C. Z.

Dr. J. D. Odom, Quarantine Officer.
 Dr. Philip Horwitz.
 Dr. W. C. Gardner.

VITAL STATISTICS.¹

EMPLOYEES.

The average number of employees on the rolls of The Panama Canal and the Panama Railroad, for the year was 14,389, as compared with 20,673 for 1920 and 24,204 for 1919.

The total admission rates to hospitals and quarters was 620.33, as compared with 671.84 in 1920 and 550.21 for 1919. For disease alone the admission rate to hospitals was 180.35, as compared with 183.91 in 1920, and 176.09 in 1919. The total admission rate to hospitals only was 211.20, as compared with 221.35 in 1920 and 210.92 in 1919. (See Chart No. 1.)

The total death rate was 6.46, as compared with 8.70 in 1920, 7.23 in 1919, 8.11 in 1918, 7.09 in 1917, 6.03 in 1916, 5.77 in 1915, and 7.04 in 1914. The death rate from disease alone was 5.70, as compared with 7.40 in 1920, and 6.20 in 1919. (See Chart No. 2.)

The constantly noneffective rate from all causes was 13.96, as compared with 14.87 in 1920, and 14.29 in 1919. (See Chart No. 3.)

The admission rate for malaria, to both hospitals and quarters, was 14.94, as compared with 19.40 in 1920, and 31.07 for 1919. The noneffective rate for malaria was 0.33, as compared with 0.45 for 1920 and 0.99 for 1919. (See Charts Nos. 4, 5, and 6.)

The admission rate for typhoid fever was 0.28, as compared with 0.24 for 1920 and 0.17 for 1919. One death from typhoid fever among employees occurred during the year.

The 5 diseases causing the highest number of hospital admissions, with their rates, were as follows:

	1920.		1921.	
	Ad-missions.	Rate.	Ad-missions.	Rate.
Venereal diseases.....	552	26.70	310	21.54
Malaria.....	401	19.40	216	15.01
Influenza.....	621	30.04	108	7.51
Diseases of the eyes and their annexa.....	152	7.35	104	7.23
Tuberculosis (various organs).....	82	3.97	38	2.64

The 5 diseases causing the highest number of deaths, with their rates, were as follows:

	1920.		1921.	
	Deaths.	Rate.	Deaths.	Rate.
Organic diseases of the heart.....	11	0.53	14	0.97
Tuberculosis (various organs).....	30	1.45	11	0.76
Nephritis (acute and chronic).....	13	.63	9	.63
Pneumonia (broncho and lobar).....	22	1.06	7	.49
Cerebral hemorrhage, apoplexy.....	6	.29	6	.42

¹ All rates given are computed as equivalent annual per 1,000.

EFFECTS OF RACE.

The admission rate to hospitals and death rate from disease, for white employees, were 246.43 and 2.59, respectively, as compared with 156.16 and 6.83 for black employees.

The admission rate to hospitals and quarters for malaria was 18.16 for white employees, as compared with 13.67 for black employees.

The death rate from disease for American employees was 2.43, as compared with 3.32 for 1920 and 1.08 for 1919.

CANAL ZONE.

EMPLOYEES AND NONEMPLOYEES.

From an average population of 31,377 in the Canal Zone, there was a total of 236 deaths during the year. Of these, 211 deaths were from disease, giving a rate of 6.72, as compared with 7.68 for 1920, and 6.89 for 1919.

The death rate for tuberculosis was 0.64, as compared with 1.02 for the preceding year, and 0.68 for 1919. Tuberculosis caused 9 per cent of all deaths from disease during the year.

There were 776 live births reported during the year, giving a birth rate of 24.73. (See Table VII.) Of these 301 were white, and 475 were black. Of the total births reported, 4 per cent were stillbirths.

Deaths among children under 1 year of age, from all causes, totaled 75, of which 10 were white, and 65 black; giving an infant mortality rate, based on the number of births reported for the year, of 33.22 for white, and 134.73 for black children, with a general average of 96.65 for 1,000 births.

Of the total deaths, 32 per cent occurred among children under 1 year of age, and 42 per cent among children under 5 years of age.

Below is a table showing the death rates for the Canal Zone from 1905 to 1921, inclusive, from all causes among both employees and nonemployees.

Year.	Popula- tion.	Deaths.	Rate per 1,000.	Year.	Popula- tion.	Deaths.	Rate per 1,000.
1905.....	23,463	828	35.29	1914.....	46,379	710	15.31
1906.....	34,095	1,700	49.86	1915.....	31,496	410	12.83
1907.....	54,036	1,708	31.60	1916.....	31,447	343	10.91
1908.....	67,146	1,273	18.95	1917.....	33,044	328	9.93
1909.....	76,900	1,025	13.33	1918.....	33,803	286	8.49
1910.....	86,465	1,251	14.47	1919.....	32,366	247	7.63
1911.....	90,434	1,385	15.32	1920.....	27,459	242	8.81
1912.....	79,279	1,129	14.24	1921.....	31,377	236	7.52
1913.....	61,700	1,047	16.97	.....	.....	.....	.....

PANAMA CITY.

EMPLOYEES AND NONEMPLOYEES.

From a population of 60,500 based on a census taken last year by the Panamanian Government, there was a total of 1,336 deaths

during the year. Of these, 1,286 were from disease, giving a rate of 21.26, as compared with 20.60 for 1920 and 18.98 for 1919.

The principal causes of deaths as compared with the preceding year, were as follows:

	Deaths in—	
	1920.	1921.
Pneumonia (broncho and lobar).....	167	223
Tuberculosis (various organs).....	206	222
Diarrhea and enteritis (including colitis).....	175	192
Nephritis (acute and chronic).....	77	109
Organic diseases of the heart.....	43	57
Cancer (various organs).....	46	40

The death rate from tuberculosis was 3.67, as compared with 3.40 for 1920, and 3.93 for 1919. Tuberculosis caused approximately 17 per cent of all deaths from disease during the year, as compared with 16 per cent for the preceding year, and 20 per cent for 1919.

There were 2,173 live births reported during the year, giving a birth rate of 38.20. Of the total births reported, 6 per cent were still-births.

There were 378 deaths among children under 1 year of age, giving an infant mortality rate, based on the number of births reported during the year, of 173.95.

Of the total deaths, 28 per cent occurred among children under 1 year of age, and 43 per cent among children under 5 years of age.

Below is a table showing the death rate in Panama City from 1905 to 1921, inclusive, from all causes, among both employees and non-employees:

Year.	Popu- lation.	Deaths.	Rate per 1,000.	Year.	Popu- lation.	Deaths.	Rate per 1,000.
1905.....	21,984	1,447	65.82	1914.....	53,948	1,863	34.53
1906.....	25,518	1,142	44.75	1915.....	60,373	1,810	29.98
1907.....	33,548	1,156	34.45	1916.....	60,778	1,765	29.04
1908.....	37,073	1,292	34.83	1917.....	61,074	1,714	28.06
1909.....	40,801	1,038	25.44	1918.....	61,369	1,314	21.41
1910.....	45,591	1,446	31.72	1919.....	61,369	1,211	19.74
1911.....	46,555	1,456	31.27	1920.....	60,500	1,297	21.44
1912.....	47,057	1,380	29.33	1921.....	60,500	1,336	22.09
1913.....	47,172	1,507	31.95				

COLON.

EMPLOYEES AND NONEMPLOYEES.

From a population of 28,789, a total of 497 deaths occurred during the year. Of these, 468 were from disease, giving a rate of 16.25, as compared with 19.82 for the preceding year, and 20.55 for 1919.

The principal causes of death, as compared with last year, follow:

	1920.	1921.
Tuberculosis (various organs).....	109	66
Diarrhea and enteritis (including colitis).....	49	40
Nephritis (acute and chronic).....	45	39
Pneumonia (broncho and lobar).....	37	39
Organic diseases of the heart.....	36	29
Bronchitis (acute and chronic).....	28	24

The death rate from tuberculosis was 2.30, as compared with 4.18 for the preceding year and 3.87 for 1919. Of the total deaths from disease, tuberculosis caused 13 per cent.

There were 919 live births reported during the year, giving a birth rate of 33.66. Of the total births reported, 5 per cent were stillbirths.

There were 128 deaths among children under 1 year of age, giving an infant mortality rate, based on the number of births reported during the year, of 139.28.

Of the total deaths, 26 per cent occurred among children under 1 year of age, and 38 per cent among children under 5 years of age.

Below is a table showing the death rate in Colon from 1905 to 1921, inclusive, from all causes, among both employees and non-employees:

Year.	Popula- tion.	Deaths.	Rate per 1,000.	Year.	Popula- tion.	Deaths.	Rate per 1,000.
1905.....	11,176	553	49.48	1914.....	23,265	590	25.36
1906.....	13,651	703	51.42	1915.....	29,331	640	21.82
1907.....	14,549	571	39.24	1916.....	24,693	696	28.19
1908.....	15,878	418	26.32	1917.....	25,386	667	26.27
1909.....	17,479	396	22.65	1918.....	26,078	616	23.62
1910.....	19,535	514	26.31	1919.....	26,078	573	21.97
1911.....	19,947	527	26.42	1920.....	26,078	554	21.24
1912.....	20,174	493	24.44	1921.....	28,789	497	17.26
1913.....	20,232	489	24.17				

GENERAL REMARKS.

The year 1921 has been one of many changes in Panama Canal operation. With the practical completion of the Canal and its subsidiary features, a readjustment of forces and divisions became necessary. Several divisions were abolished or combined with other departments or divisions and many employees were discharged. In December, 1920, there were 4,266 employees on the "gold" roll, and 14,483 employees on the "silver" roll. In December, 1921, there were remaining but 2,759 "gold" employees, and 8,168 "silver" employees, a reduction of 1,507 "gold" and 6,315 "silver" employees, a total reduction of 7,822.

In June, 1921, there arrived on the Isthmus a special Panama Canal Commission, appointed by the Secretary of War to "investigate and report upon existing conditions relating to the care, maintenance, sanitation, operation, and government of the Panama Canal and

Canal Zone, including all matters affecting the Panama Railroad and the Panama Railroad Steamship Line, and to make recommendations relative to any changes in such conditions affecting the organization, government, and operation of the Panama Canal and Canal Zone, and the operations of the Panama Railroad Company." In their report to the Secretary of War, dated September 15, 1921, they said of the Health Department:

"The health department of the Canal Zone consists of the following 3 divisions: Hospital division, sanitation division, and quarantine division.

"The work of these divisions is done in a splendid manner and the results obtained are beyond criticism, unless it be that the work is too thoroughly done. This is exceedingly difficult to prove, inasmuch as a great deal of it is preventive work and no one can say whether a less amount of prevention would accomplish reasonable results because what would be reasonably satisfactory is always a matter of opinion.

"There are, however, certain changes in organization and operation that can be made which will greatly lessen the net cost to the United States for the operation and maintenance of these activities.

"The *Hospital Division* includes hospitals at the following places: Ancon, Corozal (insane and helpless asylum), Colon, Santo Tomas, and Palo Seco (leper asylum), and dispensaries at Ancon, Balboa, Pedro Miguel, and Gatun.

"The Ancon Hospital, which is the principal hospital of the Zone, is one of the most perfect and well appointed hospitals that has come within the observation of the commission. The hospital operating cost during the calendar year 1919, was \$492,366 and in the calendar year 1920, \$592,691. The revenue during the same two years was \$228,367 and \$348,776, respectively; the net cost to the Government during the two years being \$263,979 and \$243,915, respectively, without counting interest or depreciation.

"The average number of patients treated in the hospital daily was 438 during 1919 and 427 during 1920; and during the same years 5,100 operations and 5,092 operations were performed in addition to 314 and 289 confinement cases, respectively. The average cost per patient during the same years was \$3.08 and \$3.80, respectively. The cost of food is approximately \$1.05 for white patients and \$0.53 for colored patients. The increase in cost during the year 1920 over that of 1919 is practically all due to increase in salaries and increase in the cost of food supplies.

"The salaries of the subordinates are based upon the wages of persons similarly employed in the United States and are correspondingly high. The salaries of the officials are not what they ought to be compared with wages paid to artisans in the Canal Zone.

"There are 21 doctors on duty in this hospital besides the superintendent, as against 22 doctors in January, 1919, when the total force employed was about 33 per cent larger than it now is. It is understood that no medical officer of the Army or Navy is permitted to operate in this or any other hospital of the Canal Zone. In this connection, attention is called to the surprising fact that all the doctors as well as the nurses are members of labor unions affiliated with the American Federation of Labor.

"The eight-hour law is applied to the nurses and hence the large number of nurses, but even on this basis the number is excessive.

"The cost of operation of this hospital has been compared with that of other hospitals in various parts of the United States and it is found that the Ancon Hospital compares very favorably in practically all cases.

"The laboratory of the Ancon Hospital corresponds to the municipal laboratory in a large city, and it is believed that all chemical laboratory work of the Zone should be concentrated in this laboratory.

"At the present time no charge is made either for consultations at dispensaries of which there are an abnormally large number, or for board for employees while in hospital. It is not believed that either of these free services is justified or should be continued.

"The commission believes that employees should be charged for their subsistence while in hospitals; that the Panama Railroad Company should pay for the hospital and sanitary services rendered on account of its employees, and that there should be a reduction in personnel actually employed in the hospitals.

"We are also strongly of the opinion that civilian doctors and surgeons in the hospitals should be replaced by medical officers of the Army and that serious consideration should be given to turning over the hospitals to the Army Medical Corps for operation.

"The *Sanitation Division* is in charge of a sanitation or health officer and its duties consist in the collection and disposal of garbage, mosquito prevention, rat extermination and street cleaning. The personnel consists of 28 gold and 348 silver employees.

"The work of this service is beyond criticism so far as the thoroughness and the quality of the work is concerned. We know of no city in the United States that is as clean as Panama, nor where the flies and mosquitoes are so scarce. The measure of this is the markets which are unscreened and in which food is openly exposed for sale and yet practically no flies exist. The alleys and yards are as clean as the main streets. These same statements in general apply to the towns of the Zone. The city of Colon is generally very clean for a Central American town, but it does not compare with Panama, nor are its alleys as clean as they ought to be.

"The results of this service are shown in the percentages of sick, the number of malarial cases being negligible when the character of the surrounding country is considered. The work is preventive to a very large degree, the activities being centered on eliminating the breeding places of the pests rather than on exterminating them after birth.

"By the terms of the treaty with Panama the supervision of the sanitation of the cities of Colon and Panama is under the jurisdiction of the health officer of the Canal Zone and each city contributes a certain amount toward its sanitation. It is found, however, that of a total of \$158,000 spent for prevention and sanitation \$123,000 was contributed by the United States; while of the street cleaning and garbage collection costs, \$81,300 was contributed by the United States making a total of \$205,100 contributed by the United States out of a total cost of \$324,000.

"While it would be presumptuous for laymen to advance their opinion against that of a medical officer skilled in sanitary matters, it is the opinion of the commission that a condition of super-sanitation

exists as regards malaria and that greater precautions are now being taken than are necessary reasonably to protect the health of the inhabitants of the Canal Zone.

"The commission believes that a very considerable reduction can be made in the sanitary activities without materially affecting the health and welfare of the residents of the Zone and with a material reduction in expenses.

"The *Quarantine Service* consists of the port quarantine officers and quarantine stations at Cristobal and Balboa. There are 5 gold and 16 silver employees at Balboa, and 6 gold and 15 silver employees at Cristobal. The service at each place is the ordinary quarantine service performed by the Public Health Service in the United States. The number of ships examined by the quarantine officers during the year was approximately 11 plus per day. This naturally is larger than the number of ships transiting the Canal, because it includes all ships touching at either port.

"In regard to the silver employees it is believed that the reductions of force do not follow rapidly enough the reduction in activities. No specific recommendation is made as to the size of force to be employed, but it is believed that the quarantine division should be turned over to the Public Health Service and operated under that service as is the quarantine work in any port of the United States."

Some of the above recommendations of the Special Commission were deemed impracticable and could not be put into effect, at the present time at least; other recommendations are being adopted; and yet others, notably those in regard to reduction of force in the Division of Sanitation, were already well under way before the Special Commission was sent to the Isthmus.

Also among the recommendations of the Special Commission (composed of a Brigadier General of the Army, a Captain of the Navy, and two business men) was the following:

"It is recommended that the amounts expended for sanitation in the Canal Zone be greatly reduced and if as a result the sick and death rate from malaria rises above the average in 20 of the largest cities of the United States the sanitary precautions may be increased."

This recommendation was not accepted by the Secretary of War and was not put into effect nor included in the published report of the Commission although it was published in the daily papers on the Isthmus and elsewhere and aroused much unfavorable comment. Instead of this recommendation the Secretary of War ordered as follows:

"The amounts expended for sanitation in the Zone shall be reduced as much as possible consistent with maintaining the necessary sanitary precautions requisite for the preservation of the health of American employees in tropical service."

which is the policy actually pursued by the Health Department for some years past.

Ever since the beginning of the work of the United States on the Isthmus it has been realized that permanent sanitation, in the form

of elimination of mosquito-breeding areas, rather than their control by routine temporary expedients, was desirable. To this end large swamps were drained or filled and miles of earthen, concrete, and tiled ditches installed, largely by other (engineering) departments of the Canal but charged to Health Department appropriations. In this way many of the greatest and most troublesome areas were corrected or improved. About 3 years ago the Health Department undertook to do all its minor sanitary engineering work with its own forces. The sanitary inspectors were provided with leveling instruments and, such as required it, were taught how to use them. Pocket compass and plane table surveying produced adequate maps. First, one concrete tile machine was installed at Ancon, on the Pacific side; later, another was placed at Mount Hope on the Atlantic side. Being small, portable, and easily set up, these 2 machines can be shifted from place to place, wherever there are facilities for delivering materials, and the tiles are manufactured in close proximity to the point where they are to be used.

Then was possible the policy of elimination, ditch by ditch, section by section, of remaining areas which had for years required periodical, almost weekly, attention from the laboring forces, oilers, grass cutters, ditchmen, and inspectors. Outlying districts, within the bounds of sanitated areas but which relative distance rendered comparatively more expensive to control, were first corrected. An area, once undertaken for tiling, is left, if possible, in such condition that only occasional inspection is necessary to guard against accidental or newly developed trouble. The proximity of available stone also influences the choice of areas in which rock and tile drains are to be installed. On the Pacific side good stone is plentiful and is usually found in sufficient quantity quite close by. On the Atlantic side, surrounding Gatun, Mount Hope, and Colon-Cristobal, no durable native stone occurs; that found being only a hard, indurated clay which rapidly disintegrates on weathering into a tough impermeable mass. However, in many places there we have been able to use rock from abandoned railroad beds, concrete left from wrecking operations, and other durable materials dumped as refuse, large pieces of coral from hydraulic fills, etc., so that we are still able to construct a number of durable covered drains. In other places, where economy in maintenance justifies the elimination of large areas of open ditches and durable stone is lacking, we are attempting the expedient of installing 6 or 8 inch concrete tiles, placed 2 to 3 feet below the surface, and filling in the ditches or over them with palm fronds (10 to 20 feet long) or with long tough guinea grass (which frequently grows 10 feet high), or other brush. When first installed these drains do excellent work, but we do not know just how long they will do so, nor how often the covering will have to be renewed. It is certain though that the cost of such renewal will be very small, since the necessary vegetation grows immediately alongside the drains. Of course such construction would not be satisfactory for streams carrying storm water in any amount, but from seepage drains and laterals no trouble is anticipated. In very dry areas in the dry season it may be that fire will occasionally run through a brush-filled drain, but this too will be but a small expense to repair. It is absolutely

necessary, because of the water-tight quality of the Isthmian soil, to fill ditches above the tile with permeable material, and to quarry, crush, and haul from long distances a suitable quality of stone, would run the cost of tile drains to a prohibitive sum.

There have been installed by Health Department forces in the past 3 years nearly 75,000 lineal feet of rock-covered concrete tile drains, and more than double that amount of open earthen ditches.

Because of these measures a beneficial change in the Division of Sanitation and a marked reduction of force was possible, and on September 1, 1921, a reorganization took place. To achieve this most effectively, a rearrangement of the Zone sanitary districts was made. The Mount Hope district was removed from the administrative jurisdiction of the Colon-Cristobal health office and combined with the Gatun district; this enlarged district, extending from Darien to Fort Randolph (exclusive of Cristobal and the industrial activities of Mount Hope) being now called the "Northern District." Ancon and Balboa townsites were combined into the "Ancon-Balboa District." The former Pedro Miguel district was combined with the out-of-town portions of the 2 former Ancon and Balboa districts into a new "Southern District," extending from Gamboa to the southern limits of the Canal Zone, exclusive of Ancon and Balboa. The former 5 districts involved in this change were supervised by 6 gold inspectors (5 regular and 1 relief); these 3 new districts have but 3 regular and 1 relief inspector. It has proven possible also, for short periods of time during the absence on leave of the Ancon-Balboa inspector, to have the inspector of the southern district take care of the Ancon-Balboa district also. Although a progressive reduction of both gold and silver employees of the Division of Sanitation had already been taking place for more than 2 years previously, both in the terminal cities and on the Zone, it was in the reduction of the number of silver employees made at the time of redistricting that the greatest economy was effected.

Besides the installation of permanent drainage ditches, a radical change in the method of maintenance of open ditches has been instituted. It had formerly been the general practice to go over a district by routine at stated intervals, ranging from 5 to 10 days, cleaning and grading ditches, oiling all visible water, cutting grass, and taking every precaution against the possibility of breeding of *Anopheles*. With the elimination and reduction of areas to be thus controlled it is apparent that measures less meticulous can now be applied with equal safety. In each district, instead of the foremen and their whole gangs going over the territory and doing their work perfunctorily (but thoroughly), there are now a few experienced "larva hunters" who cover the same areas, searching carefully every possible breeding place and reporting results to the inspector in charge. Only when breeding is actually found is a place oiled, and this by fewer men in but a fraction of the time formerly consumed. The sanitary inspectors and the foremen check the work of the larva hunters at frequent intervals to determine their efficiency.

The Panama Canal "larvacide," developed some years ago by the chemist of the Health Department of The Panama Canal, has won a reputation in the opinions of anti-malaria workers as an effective agent for destroying mosquito larvæ. It consists of a crude carbolic

acid-resin soap solution that readily emulsifies in water and is a potent destroyer of larvæ in highly dilute proportions. It is especially valuable in its quick action on larvæ, its ease of application, and because of the fact that it diffuses rapidly and penetrates into small pockets of water or where vegetation and débris are abundant. It is also much used where black oil can not be applied because of unsightliness or other damage it causes. When it was first developed the cost of making this larvacide was relatively low, about .14 cents a gallon, but since then the price has steadily advanced, owing to increased cost of materials, until just after the World War when it cost as high as 65 cents a gallon. The present cost is about 62 cents, and the cost of the ingredients is still slowly reducing.

Fortunately, the needs for such an agent have been greatly lessened for the same reasons as outlined above regarding maintenance work. Of late years the principal use of larvacide has been as a diluent for black oil (crude petroleum with an asphalt base) to enable it to flow freely through the piping and nozzles of spray pumps, being used in varying proportions according to the ideas of the sanitary inspectors or their foremen. Beside the excessive cost of the larvacide so used, another serious defect became apparent. It was noticed that, although the mixture flowed with ease through the pumps, when applied to the water the oil failed to spread immediately into a film but remained floating on the surface in the form of globules, requiring the application of a large amount to thoroughly cover the water with oil. Of course the larvacide present with the oil diffused and did execution on the larvæ, and at a later period of some hours, or even days, a tendency to film was noted. Experiments were undertaken by the sanitary inspector in charge of the Pedro Miguel district and the chemist of the Board of Health Laboratory to determine the cause of the non-filming of the oil and to discover, if possible, a cheaper effective diluent. It was soon noted that any soapy substance impaired or practically destroyed the filming tendency of oils and, as larvacide is a resin soap solution of carbolic acid, its detergent action on filming could not be overcome. Kerosene and other lighter oils were tried but were not satisfactory because of low filming power or excessive cost. Crude petroleum alone (also called "fuel oil" here) appeared to have the best covering power when applied to water and the solution of the problem seemed to lie solely in devising means of applying the oil economically and effectively.

A practical solution of a part of the problem was discovered by the sanitary inspector, Mr. J. L. Tolar. By heating the oil in a small tank prior to transferring it to the pump tank or barrel (mounted in a rowboat) and spraying while hot it was found that an excellent spray—practically a mist of oil—resulted, which, falling on the water, immediately spread into a nearly perfect film where vegetation and débris did not obstruct. Even in grass-grown shallows, when directly sprayed lightly at a high angle to allow the oil particles to fall as near vertically as possible, a satisfactory covering of oil was obtained. The oil was raised to an initial temperature of about 150° F., but by the time the barrel supply was exhausted (30 to 40 minutes) it had cooled considerably, not enough however to retard its application. The hot oil can be sprayed more rapidly and in far smaller quantities than was the case when the larvacide mixture was used; in fact, it can be applied to a shore line as fast as the boat can be rowed or poled along. Nor is it any longer considered necessary to

keep the grass constantly cut from the margins of the lakes, since the application of oil into these areas as described above is found to be satisfactory.

The necessity still remains, however, to discover a means of spraying crude oil satisfactorily from the portable shoulder or knapsack pumps. When first heated the oil is too hot to be carried comfortably by the oilers and it loses its heat too soon to remain sufficiently fluid until the tank is exhausted. We have, therefore, practically discarded the use of small portable sprays and are applying oil to ditches and small pools by means of mops or drags, made from strands of old rope, dipped in the cold crude oil and dragged through the ditches and pools. This method has an additional advantage in that the tenacious masses of algæ are broken up, small obstructions are dragged out and larvæ are dislodged from protected lurking places.

Drip barrels or other containers, set over the heads of streams and ditches, allowing oil to drip at frequent intervals into the water (once so popular on the Isthmus), have not been in use here for years. At the time they fell into disfavor, the complaint was that the oil failed to spread satisfactorily into the margins, pockets, and eddies of the stream, but was carried down the center of the current where mosquito larvæ are seldom found, especially our *anopheles*, which always seek the protecting shelter found at the margins and in quiet water. But as "larvacide" was then used extensively as a diluent of the oil to permit it to flow through the nozzle or wick at a regular rate it is possible that this substance was the main cause of failure of the oil to spread satisfactorily. Under present conditions here there is little need for the automatic application of oil by drips.

At present prices, a saving of at least \$8,000 a year will result from the diminished use of "larvacide," and the saving in oil and labor achieved by present methods of application will be much greater.

The chief remaining use of "larvacide" by the Health Department is as a fly destroyer and repellent.

The occurrence of malaria in employees of The Panama Canal shows a continued gratifying decrease, as shown below:

COMPARATIVE STATEMENT OF TOTAL NUMBER OF MALARIAL CASES REPORTED DURING THE CALENDAR YEARS 1919, 1920, AND 1921.

	Employees.			Nonemployees (including military).			Total.		
	1919.	1920.	1921.	1919.	1920.	1921.	1919.	1920.	1921.
Canal Zone, sanitated areas	236	138	87	637	438	611	873	576	698
Canal Zone, cattle camps, etc.	301	111	17	28	6	.....	329	117	17
Canal Zone, miscellaneous unsanited areas.	21	18	18	47	17	42	68	35	60
Colon.	70	20	9	69	21	23	139	41	32
Panama.	62	30	17	119	70	50	181	100	67
Miscellaneous out- side Zone (unsanited)...	62	84	66	462	268	524	524	352	590
Totals.	752	401	214	1,362	820	1,250	2,114	1,221	1,464
Annual rate per thousand.	31.07	19.40	14.94						

Since the greater number of those discharged by The Panama Canal remained on the Isthmus (especially of the silver forces—natives and West Indians), the total population which these statistics represent did not vary much, there being rather a shifting of the population, discharged employees moving into Panama and Colon and employees living in those cities moving into the Zone as quarters became available for them.

The number of cases of malaria among the nonemployees was large, chiefly because in this class are counted the United States military forces on the Isthmus, whose malaria rate was very high during the past year as a result of practice maneuvers that took place in the outlying unsanitated areas of the Zone and the surrounding country. During and after these maneuvers many cases of malaria developed in the men who had been so exposed and, the infection being introduced into the Army camps thereby, many successive cases as well as recurrences developed. The situation of the new large Army posts in the Canal Zone, as regards their proximity to unsanitated areas, has been described in previous annual reports of this department. While those conditions are still far from ideal, especially about the new post near Gatun, the Army sanitary organization has energetically attacked the problem and many of the worst places have been or are being corrected.

The comparative rates for malaria among the military forces, as reported by the Department Surgeon of the Army, are as follows:

	1921.	1920.	1919.	1918.
Noneffective rate per 1,000.....	4.19	1.12	2.43	1.92
Admission rate.....	131.88	47.38	54.37	66.04

Of the above 1921 admission rate, 89.58 per 1,000 were reported as new infections and 42.30 as recurrences.

The newly constructed concrete roads leading into the Republic of Panama doubtless will contribute an increased malaria incidence since they open up to easy access many formerly remote places where anopheles abound and chronic malaria is ever present.

Relatively few have been employed in cattle camps and plantations during the past year, and the administration of quinine as a prophylactic measure has been continued as before because it is impracticable to maintain sanitary conditions at these outlying places where labor is employed for brief periods each year.

With the extension of the drains in the Mount Hope-Cristobal-Colon areas, in the large swamps from which heavy flights of a distance of 2 miles were demonstrated last year, the anopheles invasion and malarial infection of the Atlantic terminal cities has been much reduced. The narrow (8-inch) sea-level drains through the low-lying swamps have been of excellent service in removing fresh water from rainfall and run-off and in admitting tide water and fish to every part.

Another recommendation of the Special Panama Canal Commission which will be put into effect by the Governor, and which will doubtless have some effect on future morbidity reports, is that to per-

mit the repopulation of Canal Zone lands for agricultural purposes. Large sections of land, outside the military reservations and Supply Department pastures and plantations, and, as required by the Health Department, farther than 1 mile from the towns, have been made available for this purpose. A prospective settler is granted a permit to occupy 5 hectares of land and to erect a dwelling house. For the latter a sufficient quantity of scrap lumber and iron roofing is given him, delivered free at the nearest railway station, though it seems that in most cases, especially far removed from the railway, a native type of house of pole and thatch would serve the purpose more easily. For the first 2 years no rent will be charged for this land, and after that time a nominal sum must be paid. This opportunity is to be granted primarily to discharged West Indian employees of The Panama Canal. Hundreds of these have expressed their desire to take advantage of it, and it should go far toward ameliorating the condition of the many cases of extreme poverty now existing among discharged Canal and railroad employees and their families in the cities of Panama and Colon.

Undoubtedly, our morbidity rates will be affected by this innovation. While the former depopulation of the Zone of all except employees of the Government and their families, was primarily for military strategic reasons, it has removed from our midst a tremendous number of foci of infections—malaria, intestinal parasites, and other tropical diseases—making the question of sanitation comparatively simple by localizing it about the settlements in which the employees lived and worked. These newcomers will be widely scattered over areas difficult of access by jungle trails, streams, and the lake. They will have to depend solely on surface water supplies which, during the dry season, will have to be conserved carefully. Naturally they must select sites near water courses, springs, or the lake. In view of the now well-recognized long flight of our malaria-bearing anophelines, mosquito control for them will be altogether impossible; screened houses, our next best defense if not the first, are out of question. The Health Department will attempt some supervision and will endeavor to get these people to aid themselves as far as possible, by instructing them as to the construction of pit closets to avoid soil and water pollution, and getting them to reduce mosquito breeding in the immediate vicinity of the home. However, their isolation, though largely protecting the Government employees and their families from the dangers of contact, will place these poor people beyond the ordinary medical care and supervision that might be desired, and in these newly settled areas will arise conditions very similar to those now existing in the Republic of Panama outside the pale of American sanitation. Fortunately, most of these people are West Indians of African descent and there is a growing belief here that these are more resistant to malarial infection than even the native Panamanians.

Be these things as they may, the prime necessity exists of relieving these people from hunger and poverty and the cities of Panama and Colon of a growing population of idle blacks, so in any event there should be an ultimate gain.

In January and February the combined Pacific and Atlantic fleets of the U. S. Navy (70 warships of all classes and 12 seaplanes) assembled in Panama Bay for maneuvers, remaining at Balboa over

a week. The Atlantic fleet made 2 transits of the Canal. Immediately upon the arrival of each vessel, her commanding officer was furnished, by authority of the Secretary of the Navy, a blank on which to report to the Chief Health Officer all cases of malaria occurring aboard the ship during or immediately after her stay in these waters. This was done to learn, if possible, the relative danger of contracting malaria on ships in the Panama Canal waters. *Of the 45,000 men of the visiting fleets, not a single case of malaria was reported to result from their stay here.* Many of the men were granted shore leave and visited points of interest in the vicinity. True, the fleets were here during the dry season, when mosquito breeding is at a minimum, but along stretches of the Canal and in the surrounding country outside the sanitized areas sufficient springs and other water sources remain to furnish anopheline mosquitoes the whole year round and this unusual test of Canal sanitation was noted with interest and gratification.

Physical examination of school children.—The annual physical examination of school children was made in October, with the following results:

Number of physical examinations made.....	1,644
Number found needing treatment.....	891
Number with defects other than those of teeth only.....	595
Number with defects of teeth as only defect.....	284
Defects found:	
Defective vision.....	237
Defective hearing.....	41
Defective nasal breathing.....	66
Hypertrophied tonsils.....	214
Pulmonary diseases.....	13
Cardiac diseases.....	24
Chorea or other nervous disorders.....	10
Orthopedic defects.....	68
Malnutrition.....	4
Defective teeth.....	452
Contagious diseases.....	18
Total defects.....	1,147
Number of cases reported treated, defective teeth.....	10
Number of cases reported treated for defects other than teeth.....	160
Number of vaccinations.....	348
Number of "takes" reported.....	152

The parent of a child is notified of any defects or disease found and is urged to have it corrected. A physical record of each child is kept throughout his entire school life and each year it is noted whether defects have been treated or neglected, improved or increased, and in this way the parent can be further impressed with the need of treatment in many cases.

Typhoid fever.—Thirty-two cases of typhoid fever were treated in Canal Zone and other hospitals. Of these, 7 were from Panama, 7 from Colon, 5 from the Canal Zone, and 13 were nonresidents. In every instance where the case developed locally a thorough investigation was made, but in no case among the resident population was the source of infection definitely discovered. But 1 carrier was discovered (*See report of Board of Health Laboratory, following*) but it is suspected that unrecognized carriers are responsible for nearly all our cases. At no time has the disease existed in such proportions as to cast suspicion on the milk supply (this being all pasteurized and bottled) and the public water supplies are entirely

above reproach. Two known carriers were operated on for removal of gall bladder. One was apparently relieved of her carrier condition, the other not.

Rats and antiplague work.—The danger of an invasion of bubonic plague looms ever threateningly over the ports of the world, and The Panama Canal is fully cognizant of the menace. Since the 2 cases at La Boca in 1905 and the anti-rat campaign that followed, not a single case of human or animal plague has appeared here. Rat-proofing of buildings is insisted on and every effort is made to store material and protect foodstuffs so as to discourage rat harboring and propagation. Trapping of rats as an index of their prevalence and to secure specimens for the laboratory is regularly done at the terminal ports. If any building is found to be especially infested it is closely inspected and defects, if any exist, are corrected. Poisoning by barium carbonate is occasionally resorted to in commissary stores and warehouses. In addition to our internal measures against rats, the quarantine service exercises careful supervision over shipping, fumigating ships where this is indicated, and requiring proper rat-guarding of lines, gang planks, etc.

Fly control.—Because of the new garbage incinerator and the new public stables at Colon, the 2 Atlantic side cities are almost flyless. On the Pacific side the situation is not so nearly ideal. Here the garbage has been buried for more than a year past, the large incinerator on Gavilan Island standing idle, partly because of lack of funds to operate it and partly because of the smoke nuisance claimed by the residents of a near-by Army post. Some valuable sanitary fills have been made with the garbage. All the garbage of Panama and the Zone cities of Balboa and Ancon is now being buried in a large dump near the sea, east of Panama City. Each day's dumping is carefully covered with a 6-inch layer of earth, and for 10 days following its burial the surface is sprayed with the "larvicide" emulsion to kill fly larvæ and adults. This is fairly successful, but the fact is evident that many flies do escape. All manure is either buried or composted in large pits, the latter being sold to Chinese gardeners. Here too, quite a few flies are bred, though every reasonable effort is made to keep such breeding at a minimum, and it is believed that the value of the fresh vegetables provided by the gardens more than offsets the comparatively small fly nuisance resulting. With our excellent water and sewer systems the danger of fly-borne disease is not a grave one, and, even with the known sources of breeding just described, the flies are at a noticeable minimum as compared with many parts of the States in midsummer.

HEALTH OFFICE, PANAMA CITY.

(Dr. HENRY GOLDTHWAITE, Health Officer.)

Malaria.—The following is a table of the malaria cases charged to the city of Panama during the years 1916 to 1921:

1916.....	235
1917.....	187
1918.....	97
1919.....	181
1920.....	100
1921.....	67

Many of these cases undoubtedly originated in the unsanitated Sabañas area east of the city, where we know that anophelines abound yet is much frequented by residents of Panama City and the Canal Zone. It is hardly possible that many cases of malaria can originate within the city and its environs which are thoroughly sanitized. With the extension and improvement of the national highways of the Republic, thereby giving easier access to the interior by a system of ideal roads, it may be expected that many cases of malaria will be brought into the city.

Oil used in antimosquito work for the past several years has been as follows:

	Gallons
1917.....	44,896
1918.....	15,701
1919.....	17,828
1920.....	9,365
1921.....	7,170

With the continued improvement of the drainage system and the constant effort to reduce the area requiring maintenance, there has been a very marked reduction in the use of oil during the past few years, and a further decrease will be possible in the near future by the continued straightening of old ditches and filling in of all low areas wherever possible, and a change in the method of oiling (see "General Remarks.")

Infant mortality.—The following shows the annual death rate of infants under 1 year of age for the years 1915 to 1921:

	Rate per 1,000 births.
1915.....	221
1916.....	236
1917.....	238
1918.....	188
1919.....	154
1920.....	155
1921.....	174

The increase during the past year may be due, in part at least, to the poverty of the people. The general depression throughout the world has been felt here and the large number of laborers working for The Panama Canal who have been discharged has added to the already considerable amount of poverty existing in the city. The high infant mortality rate in general is due to several causes, among which are the large number of laboring people who have little knowledge of the care of children, the crowded and dark tenement houses with no yards for recreation, and the financial condition of the people. Two women with practical knowledge of obstetrical work, one a West Indian and the other a Panamanian, have been employed by this office to visit expectant mothers, and mothers with nursing children, and to attempt to persuade them to visit the Pre-natal Clinic at Santo Tomas Hospital, and to give them some practical advice on care of themselves and children. During the time these 2 women have been employed—a little over half a year—they have made 3,873 house visits, and 1,769 hospital visits were made by the patients.

Smallpox.—Cases of smallpox continued to appear throughout the year, as a large part of the Republic outside of the cities of Panama

and Colon is infected with this disease, and cases are continually coming into the city by boat, often infecting others who had not been successfully vaccinated in recent years. Fifty-six cases were sent to the hospital from this city and 15,516 persons were vaccinated during the year. Owing to continued rumors of smallpox in the Pearl Islands and the villages on the main coast adjacent to the islands, an investigation was made. In 4 days approximately 800 people were vaccinated; evidence was found of a few recent cases of smallpox. The Government of Panama should institute a campaign of vaccination throughout the Republic, as a large proportion of the population is entirely unvaccinated.

Veterinary and meat inspection work.—Fees collected as a result of the work of our veterinarian amounted to \$1,387.13, which includes fees collected for the inspection of cattle and swine and disinfection of hides and skins. Quarantine inspection of 5,825 cattle and 4,247 hogs were made during the year. There were 13,697 cattle, 10,687 hogs, 324 goats, and 3 calves slaughtered at the municipal abattoir under the supervision of our veterinarian. Of these, the following were condemned:

Cattle:		Hogs:	
Septicemia.....	2	Trichiniasis.....	493
Anthrax.....	1	Cholera.....	23
Tuberculosis.....	1	Prostration, heat.....	13
Drowned.....	1	Pyemia.....	4
Peritonitis.....	2	Pneumonia.....	2
Pneumonia.....	2	Extensive trauma.....	2
Extensive trauma.....	3		
Pericarditis.....	1		
Cause not stated.....	7		

Besides the above, many livers, heads, and quarters were also condemned. In addition to the 1 anthrax case at the abattoir, 2 head of cattle died from this disease at the Ramon Arias farm during the year, and 3 cases of Texas fever were reported fatal in the same vicinity. Six hundred and forty of the dairy cattle producing milk consumed in this city were tested for tuberculosis during the year.

Flies.—The same method of fighting flies has been continued this year, that is, first, by attempting to destroy all breeding places, and second, by using wires dipped in "tanglefoot mixture" around public markets and stables to catch as many as possible of those not destroyed in their breeding places.

Milk and dairies.—The milk situation in Panama continues good. The milk produced is of a high grade and practically all milk sold is pasteurized. The bacterial count for raw milk as a whole is low, many running from 20,000 to 30,000, and few exceeding 300,000 or 400,000. The actual output of milk from the dairies of the city and its environs has about quadrupled in the past 18 months. This is due to the improved methods of feeding and caring for the cattle generally, largely the result of suggestions and directions by the health office. With possibly 2 exceptions, prior to 3 years ago all dairymen milked once a day only and the calves were left with the cows during the remainder of the time, the barns were filthy and the water supply in most instances was bad; practically all these conditions have now been corrected.

Fines.—There were 851 fines imposed for violation of the sanitary regulations, and \$1,565.75 collected as a result thereof.

Garbage disposal.—All garbage from the city of Panama, and from Ancon, Balboa, and Fort Amador, has been buried by the forces of this office during the year. This was done at a cost of about \$1,700 a month for labor, material, and supervision—about two-thirds the cost when garbage was disposed of by incineration.

Venereal diseases.—During the year 318 cases of syphilis and 739 cases of gonorrhea were reported to this office; 5,044 examinations of women were made at the Santo Tomas Hospital. (See Venereal Clinic under Santo Tomas Hospital.)

Tuberculosis.—The number of deaths from tuberculosis for the years 1914 to 1921 are as follows:

1914.....	229
1915.....	245
1916.....	313
1917.....	348
1918.....	254
1919.....	241
1920.....	206
1921.....	222

The remarks previously made regarding infant mortality apply to some extent to the tuberculosis question. The constantly increasing poverty of the people naturally is going to make the general mortality higher, especially in infants and those suffering from tuberculosis, as no undernourished person can well manage to maintain any degree of health in this climate, and especially under such living conditions as obtain here. Reference is particularly made to the overcrowded condition of the tenement houses.

Soup kitchens.—During the year 2 soup kitchens were operated in the city of Panama. The one operated by Major Bocock at Santo Tomas Hospital has done most excellent work, and the same can be said of the one operated by the American Episcopal Church; the former is located in the Spanish section of the city, and the latter is in the West Indian section.

HEALTH OFFICE, CRISTOBAL-COLON.

(Dr. J. L. BYRD, Health Officer.)

Organization.—There has been a considerable reduction of force at this station during the year, as shown by the following table:

	Force—	
	1920.	1921.
Sanitary inspectors.....	6	2
Veterinarians.....	3	2
Clerks.....	2	1
Nurse.....	1	1
Silver employees.....	112	86
Total.....	124	93

In order to make the above reductions it required a complete re-organization of the entire force. Competent silver employees were placed in responsible positions under the supervision of sanitary inspectors, and the efficiency of the organization has not been reduced by these reductions—the district is in as good if not better sanitary condition than ever before.

Malaria.—The following table shows the number of malarial cases charged to this district from 1916 to 1921, inclusive:

1916.....	162
1917.....	105
1918.....	41
1919.....	281
1920.....	98
1921.....	44

This remarkable reduction in the malarial rate for Colon-Cristobal is indeed gratifying. When one considers the flying powers of the anopheles and the proximity of Colon-Cristobal to extensive breeding areas which almost surround the cities, the results are rather above expectation.

Infant mortality.—The infant mortality rate for the city of Colon for the past 5 years has been as follows:

	Rate per 1,000 births.
1917.....	245
1918.....	185
1919.....	155
1920.....	142
1921.....	139

This table shows a very good result of the child welfare work that has been done by the visiting nurse and the Cristobal Woman's Club free clinic. The elimination of the fly nuisance by the new garbage incinerator has undoubtedly contributed to the lowering of the infant mortality rate.

The Cristobal Woman's Club free clinic was opened June 6, 1921, and since that time the following cases have been treated.:

Surgical.....	3,259
Medical.....	3,227
Prenatal.....	307
Babies treated.....	1,237
Vaccinations.....	2,674
Free meals served.....	5,000
Specimens sent to laboratory for Wassermann and other examinations.....	326

The Health Officer is director of this clinic.

Tuberculosis.—The death rate from tuberculosis was 2.30 as compared with 4.18 for the preceding year and 3.87 for 1919. The total number of deaths from tuberculosis was 66 compared with 109 for 1920. This reduction in the tuberculosis death rate was partly due to the building of a large number of quarters for "silver" employees at Mount Hope and the subsequent relief from overcrowded conditions in the tenement houses of Colon. The modern quarters erected at Mount Hope adequately accommodated over 600 families and greatly improved their living conditions. The special tuberculosis clinic and the educational campaign carried on at the Woman's Club clinic has also helped to reduce the rate.

The number of deaths from tuberculosis from 1914 to 1921, of residents of Colon, have been as follows:

1914.....	86
1915.....	74
1916.....	91
1917.....	113
1918.....	116
1919.....	101
1920.....	109
1921.....	66

Smallpox.—There were 107 cases of smallpox reported in this district during the year. The first case was reported January 3, and the last one May 26. The source of the infection was probably from the interior of the Republic as it is endemic there. House-to-house vaccination was instituted and the vaccination of all newborn babies after 3 months of age and school children was thoroughly carried out. There were 19,824 vaccinations performed during the year.

Veterinary work and meat inspection.—This work consists of anti and post mortem inspections of all animals slaughtered at The Panama Canal abattoir at Mount Hope and the Colon municipal abattoir, and the quarantine inspection and testing of all animals imported into the Canal Zone or the Republic of Panama at this end. The revenue derived from this work amounted to \$5,735. The salaries of veterinarians employed for this work amounted to \$6,954. All of the cows in the Corozal dairy herd were given the tuberculin test by an inspector from this office, all passing the test satisfactorily except 3 which were isolated and held for retest; 1 died before retest could be given and showed extensive tubercular lesions. Mindi dairy herd has not been tested during the past year.

Garbage disposal.—The Mount Hope incinerator continued in operation throughout the year. Garbage, rubbish, and manure are consumed without difficulty; 22,329 tons of garbage and 18 animals were incinerated during the year. By reduction in force and other economic measures the operation of this incinerator was reduced from a monthly expenditure of about \$2,800 to \$1,600.

Garbage collection.—This office instituted the every-other-day system of garbage collection from gold quarters on December 1, 1921, which resulted in a saving of about \$500 per month. There have been very few complaints, and after it is thoroughly systematized there should be no complaints.

Flies.—Colon and Cristóbal are almost flyless. The fly has become so scarce that some of the new inhabitants are of the opinion that flies do not breed well in this country.

Rats.—The rat-proofing of buildings, the elevation of bulky material and foodstuffs from the floor or ground, the trapping and periodic poisoning of rats, was continued throughout the year.

Fines imposed for violation of sanitary regulations numbered 178 and amounted to \$530.

QUARANTINE DIVISION.

(Surgeon W. C. RUCKER, U. S. P. H. S., Chief Quarantine Officer.)

During the year an attempt has been made to increase the efficiency of quarantine procedures and at the same time to introduce means which will reduce delays to passengers and ships. In the carrying out of this policy the strictest economy has been observed, with the result that the total net cost of operations has been reduced \$9,948.52 from that of the calendar year 1920.

The plan of increasing cooperative relations with the countries of Central and South America (*See last year's report*) has been continued. Sanitary officers of several of these nations have visited the Canal Zone and have thus become acquainted with the public health work of the Isthmus. This has a distinctly stimulating effect upon other countries because the Panama Canal Zone is a hygienic object lesson demonstrating to the world the health ideals of the American people. By throwing open the laboratories and field sanitary work of the Canal to the inspection and study of visitors, a diffusion of these ideals is possible and thereby the danger of the exportation of disease from other countries and the hazard of its introduction into the Canal Zone are correspondingly diminished.

During the year the Chief Quarantine Officer made a journey to Venezuela with a view to determining if it would be safe to lift the quarantine which for many years had been imposed against vessels and passengers coming from ports in that country. After a careful survey of the work which is being accomplished there by the Director de Sanidad Nacional, Dr. L. G. Chacin Itriago, the quarantine was raised.

The geographic position of the Panama Canal makes it possible to utilize it, in a quarantine sense, as a gigantic filter for the removal of disease from the circulation of maritime commerce, thus inhibiting the world-spread of disease. The periodic fumigation of ships, the instruction of owners, agents, and officers of ships as to the necessity for adequately rat-guarding vessels, the vaccination of crews and passengers, and the investigation of disease outbreaks on board arriving ships, combine to this end as well as to the protection of the Canal Zone and the vessels using Canal ports and waterways. For example, an outbreak of mild smallpox on the U. S. S. *Mississippi* was handled without secondary cases or spread to other ships of the fleet and cerebrospinal meningitis on the steamship *Anyo Maru* was successfully controlled. It is believed that the order directing attention to the necessity for adequately rat-guarding ships has produced results of widespread benefit; certainly the requirement of periodic fumigation has reduced greatly the occurrence of rodents on ships, many of which formerly teemed with rats but now contain very few.

During the year orders were issued granting to vessels of the U. S. Navy the privilege of securing pratique by wireless and placing aircraft in the same quarantine category as water craft. As a measure of economy, the quarantine inspection service at Bocas del Toro was discontinued November 1, 1921. This could be done with safety since practically all ships entering that port call at Cristobal. At the request of the President of the Republic of Panama all vessels from Bocas del Toro or the ports of Chiriqui Province were subjected to quarantine inspection at the ports of Cristobal and Balboa in order to exclude smallpox. The quarantine which was enforced against Peru on account of an outbreak of yellow fever in its northern provinces was lifted on account of the very effective suppressive measures which had been put in force.

The immigration operations have continued as in former years but the attempted importation of immoral persons in anticipation of the Battle Fleet maneuvers made it necessary that unusual precautions be taken to prevent the landing of persons liable to become public charges, or dangerous to the health or welfare of the Canal Zone and the Republic of Panama.

In the Chief Health Officer's Report for the calendar year 1920 there was set forth a compilation of the saving which accrues directly to ships through the reduction of quarantine detentions. The loss was arbitrarily set at 50 cents per ton detention day and \$5 per passenger detention day. On this basis and exclusive of the Naval crew and vessel detention the table is herewith brought up to date:

Year.	Total tons received.	Total ton-detention days.	Total passenger detention days.	Total loss.	Loss per 1,000 tons received.
1918.....	11,572,473	154,176	38,169	\$267,935.00	\$23.15
1919.....	14,512,721	161,376	18,570	173,538.00	11.96
1920.....	22,128,254	48,172	33,436	191,266.00	8.64
1921.....	22,067,792	80,786	14,161	111,198.00	5.04

QUARANTINE OPERATIONS, CALENDAR YEAR 1921.

	Cristobal.	Balboa.	Bocas del Toro.	Total.
Vessels inspected and passed.....	2,210	1,586	310	4,106
Vessels passed on certificate of ships' medical officers.....	157	67		224
Vessels detained in quarantine.....	3	15		18
Vessels given provisional pratique.....	1	5		6
Vessels not inspected.....			192	192
Total arriving vessels.....	2,371	1,673	502	4,546
Supplementary inspections of vessels.....	2,393	358		2,751
Number of days vessels were held.....	3	38		41
Number of ton-detention days.....	16,304	397,117		413,421
Vessels fumigated:				
For rats.....	91	21		112
For mosquitoes.....	5			5
For disease.....	1			1
Total vessels fumigated.....	97	21		118
Crew inspected on arrival.....	130,108	83,615	12,088	225,811
Passengers inspected on arrival.....	46,820	22,691	9,724	79,235
Crew passed on certificate of medical officers.....	47,238	61,447		108,685
Passengers passed on certificate of ships' medical officers.....	4,463	1,108		5,571
Total persons arriving.....	228,629	168,861	21,812	419,302
Supplementary inspections of persons on detained vessels.....	299	9,970		10,269
Persons detained in quarantine station.....	328	1,533		1,861
Days detention for yellow fever.....	268	347		615
Days detention for plague.....				
Days detention for other diseases.....	2,295	46,023		48,318
Total days detention in quarantine station.....	2,563	46,370		48,933
Persons detained on board vessels.....	446	3,454		3,900
Days detention for yellow fever.....		1,358		1,358
Days detention for plague.....				
Days detention for other diseases.....	446	29,386		29,832
Total days detention on board vessels.....	446	21,744		22,190
Persons vaccinated.....	709	626	1,018	2,353

* Including 12 seaplanes, U. S. Navy. † Including 332,635 ton-detention days, naval vessels.

‡ Including 1,962 passenger-detention days, U. S. Navy. § Including 15,000 passenger-detention days, U. S. Navy.

IMMIGRATION OPERATIONS.

	Cristobal.	Balboa.	Total.
Persons detained.....	70	1,291	1,361
Number of days detained.....	368	15,250	15,618
Persons deported:			
Liable to become public charges.....	194	14	208
Undesirables.....	206	14	220
Stowaways.....	155	147	202
Diseased.....	7		7
Totals.....	562	175	737

ANCON HOSPITAL.

(Col. L. T. HESS, U. S. Army, Superintendent.)

Patients.—The daily average number of patients in hospital dropped to such numbers at the latter part of the year that it was possible to evacuate the entire Section "A" of patients (white American male) and transfer them to Wards 15 and 16 of Section "D," and Ward 10, Section "C," with resulting economy and no loss in the efficiency of services rendered.

Surgical clinic.—During the year, 1,603 major operations and 3,562 minor operations were performed, 2,598 cases visited the out-patient department for whom 359 prescriptions were written, and 267 obstetrical cases were delivered.

Medical clinic.—There were treated in the out-patient department, 2,052 cases, for whom 1,296 prescriptions were written. There were 207 cases of smallpox admitted during the year, with 1 death—a colored infant. There were 3,374 adults vaccinated, with 519 known "takes;" 593 school children were vaccinated, with 179 known "takes."

Eye and ear clinic.—Eight thousand six hundred and ninety-one cases visited the out-patient department, for whom 4,268 prescriptions were written; 1,406 refractions were made, and 1,479 operations performed.

X-ray clinic.—There were 2,572 cases handled; 5,325 plates, 81 films, and 1,612 dental films, were made.

Steward's department.—During the year 124,989 rations were issued to Ancon Hospital patients, and 83,404 rations were issued to hospital personnel—a total of 208,393 rations, the net cost of the supplies for these rations being \$81,568.74. There were 25,445 rations issued to pay boarders, for which \$18,602.96 was received.

Motor transportation.—All cars were kept in good state of repairs. Mechanical repairs, except emergency road repairs, are now made in the motor-car house by the employees of the Motor Transportation Division, instead of in the hospital garage. Certain of the transportation is requiring considerable repairs and will probably have to be replaced before long. No new equipment was put in service during the year.

	Cost of equipment.	Net running expenses.		Mileage.	
		1921.	1920.	1921.	1920.
Truck No. 282.....	\$844.59	\$1,406.40	\$1,170.56	5,884	6,700
Truck No. 1209.....	833.21	794.95	1,199.80	7,663	7,258
Hearse No. 305.....	1,412.74	766.74	707.33	982	1,248
Ambulance No. 301.....	632.50	1,576.21	1,320.42	6,398	6,917
Ambulance No. 303.....	604.02	1,458.45	2,021.02	6,800	7,834
Ambulance No. 308.....	762.30	1,412.42	1,975.33	6,403	8,935
Totals.....	5,089.36	7,415.17	8,394.46	34,130	38,892

Grounds.—New boundaries of the hospital reservation have been fixed, with the result that fruit trees which had been planted by hospital forces in former years are no longer within the limits of the grounds and their fruits no longer available to the hospital. During the months of January to May, the dry season, all the lawns around hospital buildings were well-fertilized with a mixture of earth, compost, and bone meal.

In September, Dr. David Fairchild, of the Department of Agriculture, visited the hospital. He went over the grounds and demonstrated "shield budding" of avocados and mangoes. Two "Nimlioh" avocados he budded successfully; the others failed. Subsequently he shipped to the hospital bud-wood of "Trappe," "Pollock," "Simmonds," "Dade," "Butler," and "Gottfried" avocados. Successful "takes" have been obtained of each one. He also furnished bud-wood of the following mangoes: "Hayden," "Mulgoba," "Paheri," "Kavaspe Patil," "Amini," "Totofari," and "Saigon." A successful "take" has been obtained only of the "Kavaspe Patil," but there are possibilities of takes of "Hayden" and "Mulgoba" buds.

Doctor Fairchild also had sent to us young trees of *Taraktogenos kurzii*, *Hydnocarpus castanea*, *Hydnocarpus wightiana*, and *Hydnocarpus anthelminica*, from which chaulmoogra oil is obtained, and these have been planted in the hospital grounds.

The Bureau of Plant Industry also sent the hospital 100 rose plants, some tulip and narcissus bulbs, and seeds of zinnias, cannas, nasturtium, poppies, and chrysanthemums. The roses and zinnias have been very prolific and with the flowers and plants already in the grounds, there has been an abundance of flowers for the patients. We also planted 50 avocado and mango seedlings. Many fruits, gathered from plants in the hospital reservation, were turned into the kitchen for consumption by patients.

Maintenance repairs.—The usual routine repair and maintenance work has been done during the year by the hospital artisans. In addition a quantity of small equipment and a number of building changes and additions were made.

REPORT OF PATIENT DAYS.

1921.....	263,710
1920.....	296,946
1919.....	312,737
1918.....	319,908
1917.....	311,451
1916.....	270,294
1915.....	268,945
1914.....	338,901

**COST OF SUBSISTENCE SUPPLIES PER PATIENT PER DAY
(ANCON HOSPITAL ONLY).**

1921.....	\$0. 3915
1920.....	4630
1919.....	3495
1918.....	3150
1917.....	3369
1916.....	2522
1915.....	2372
1914.....	2530

MOVEMENT OF PATIENTS, NONRESIDENTS OF CANAL ZONE.

	Total number treated.			Died.			Days treated.		
	Ancon Hospital.	Corozal Hospital.	Total.	Ancon Hospital.	Corozal Hospital.	Total.	Ancon Hospital.	Corozal Hospital.	Total.
1917..	274	76	350	7	3	10	5,101	21,396	26,497
1918..	510	76	586	9	10	19	7,667	20,431	28,098
1919..	883	56	939	19	3	22	14,534	17,245	31,779
1920..	1,250	54	1,304	16	1	17	24,418	15,979	40,397
1921..	584	54	638	11	1	12	11,043	13,657	24,700

DATA REGARDING PATIENTS.

	1921.	1920.	1919.	1918.	1917.	1916.
Chronic patients:						
Total number treated.....	33	33	34	38	63	52
Total number days treatment..	9,514	9,626	9,710	8,603	9,836	9,174
Average number of patients per day.....	26	26	27	26	27	25
Average per capita cost.....	\$0.324	\$0.315	\$0.2654	\$0.2602	\$0.2520	\$0.2400
Movement of military patients:						
Total number of admissions....	1,449	860	1,392	4,165	2,469	1,937
Total number of days relief....	25,146	15,134	22,217	49,067	33,494	28,519
Average number constantly sick.	68.89	41.35	60.90	134.49	91.76	78.13
Total admissions:						
To Ancon Hospital.....	8,146	9,783	10,503	12,153	10,880	9,116
To Corozal Hospital.....	227	170	151	229	191	225
To chronic ward.....	7	7	8	13	45	26
To cripple farm.....	5	12	17	39	54	59
Totals.....	8,385	9,972	10,679	12,434	11,170	9,426
Deaths:						
Ancon Hospital.....	222	276	343	336	368	325
Corozal Hospital.....	26	32	43	73	30	57
Operations:						
Major surgical operations.....	1,603	1,653	1,688	1,784	1,684	1,465
Minor surgical operations.....	3,562	5,781	5,813	4,424	1,775	1,333
Eye and ear operations.....	1,479	1,215	1,044	1,088	855	622
Refractions.....	1,406	1,052	1,263	1,312	1,108	1,378
Obstetrical cases delivered....	268	289	314	321	301	246
Out-patient department:						
Total visits.....	13,341	13,123	13,833	14,276	11,784	13,888
Prescriptions written.....	5,923	4,708	5,424	2,430	3,798	6,289
Dispensary (district physician, Ancon):						
Total treated.....	90,623	105,171	102,034	92,201	142,290	130,219

FINANCIAL STATEMENT (ANCON HOSPITAL ONLY).

	1921.	1920.
Operating expenses.....	\$577,086.50	\$592,691.54
Revenue.....	312,132.40	348,776.06
Net cost.....	264,954.10	243,915.48
Gross cost per patient per day.....	4.62	3.83
Net cost per patient per day.....	2.12	1.58
Operating expenses, dispensary.....	18,518.85	18,264.89
Revenue, dispensary.....	572.50	643.25

COROZAL HOSPITAL.

(Dr. LOUIS WENDER, Superintendent.)

Buildings.—There was no new construction at the hospital except a shed for the shelter of the dairy equipment. Necessary repairs and painting of the various wards were done.

Hospital department.—The census of the hospital on December 31, 1921, was 401, as compared with 377 on the same day of last year. This increase in population is due to the fact that we have been able to deport only 76 of the West Indian patients on account of difficulty in obtaining transportation. The number of admissions, however, was much higher this year than last year; the total admitted was 227, as compared with 170 for the preceding year. But our discharges were also higher than last year—177 discharges and 26 deaths, in 1921, as compared with 145 discharges and 32 deaths during 1920. Of those discharged, 32 per cent were well, 32 per cent improved, and 36 per cent unimproved. Of the total admissions, 105 were Panama pay cases (chargeable to the Republic of Panama, which has no insane asylum of its own) and the rest were Canal Zone charity or private pay. The 64 per cent discharged as well or improved compares very favorably with the best institutions in the United States. This can be accounted for by the fact that it is our constant effort to come into personal contact with each individual case, and to make an individual study of each and to treat it accordingly. The fact that we are dealing with individuals of a naturally low intelligence and education makes it at times difficult to discuss their mental disorders with them from a psycho-analytic standpoint. However, we are able to treat these individuals and to endeavor to alleviate their mental conflicts by teaching them to adapt themselves to another environment, re-educating them, and making their sojourn here as comfortable as we can with the facilities available. They are all encouraged to do some work, to read, to attend the moving picture shows and phonograph concerts, to take various exercises in the open when the weather permits, and it is with great satisfaction that the wonderful improvement in the mental condition of some of them is noted. Those suffering from psychosis due to an exogenous cause are treated accordingly. About 15 per cent of the patients during the year suffered from syphilitic psychoses and were treated for this disorder. We injected 517 doses of salvarsan and its preparations intravenously, and made 179 lumbar punctures on these individuals. We have met with much success in the treat-

ment of patients suffering from cerebral syphilis, but regret that we are unable to make a similar statement as to those suffering from general paralysis of the insane.

Those patients who show a slightly higher mental capacity are placed in the occupational ward, where the men are taught to do wood work, painting, tin work, and to assist in making brooms. The women are taught how to make rugs and baskets, and to embroider, crochet, do needle work, etc. All articles that these patients make are sold and part of the funds are utilized to purchase material for the upkeep of this industry, the balance being turned in for credit to the hospital. For the calendar year a surplus of \$1,100 was thus turned in. The female patients that can not be accommodated in the occupational ward, owing to its limited capacity, are sent to the laundry, the salvage ward (where old bandages, rugs, mops, etc., are salvaged), and sewing room where patients' clothes are mended and new ones made. The male population are put to work in the field, planting vegetables and fruits. The following products were gathered in the year 1921 from the patients' garden:

Bananas.....	bunches..	4,003
String beans.....	pounds..	1,076
Cabbage.....	pounds..	1,431
Corn.....	ears..	3,856
Cucumbers.....	pounds..	654
Lettuce.....	heads..	111
Mustard greens.....	pounds..	203
Green onions.....	pounds..	451
Okra.....	pounds..	1,067
Papaya.....	pounds..	4,833
Avocados.....	each..	896
Plantains.....	each..	11,106
Sweet potatoes.....	pounds..	14,083
Pineapples.....	each..	933
Radishes.....	bunches..	985
Tomatoes.....	pounds..	510
Spinach.....	pounds..	2,855
Yams.....	pounds..	13,451
Yuca.....	pounds..	30,634

Besides the above, there were many other vegetables in smaller quantities. The total value of produce from the patients' garden consumed by the hospital amounted to \$3,555. This financial gain to the hospital is not the important fact, however; keeping the patients busy, thereby relieving them from their mental stress and improving their physical condition, is the most important purpose served by the garden. All patients who work receive a small monthly compensation with which they are able to purchase at the hospital tobacco, fruit, candy, and other small luxuries. Whenever discharged, they receive the money they have saved from their earnings.

All male patients suffering from acute mental disorder receive hydro-therapeutic treatment daily. The average number of patients treated daily ranges from 25 to 30. A similar plant is needed for the female patients.

Chronics.—We have at present 1 white patient and 24 colored patients suffering from chronic physical disease. The colored patients are accommodated in one of the wards from which all insane patients have been removed. Those who are capable of performing some work are encouraged to do so and as a result we have some who roll bandages, others assist with the ward work, and 3 make brooms.

These are compensated for the work they perform, and no restriction is placed on the manner in which they spend their money. The latter 3 average about 100 brooms a week, which are easily sold to the commissary and outsiders; one is suffering from organic lesion of the spinal cord, one is legless, and the third has chronic ulcers of the leg.

Hospital grounds.—The grounds are maintained by male patients under the supervision of an orderly. Plants and hedges are kept in order and the grass cut weekly. It is considered important that the surroundings of an insane hospital should be attractive and pleasant and effort is made in this direction. Flowers which are cut from the hospital inclosure are placed in the wards daily. By the courtesy of Dr. David Fairchild, of the Department of Agriculture, who visited the Isthmus in September, we obtained the following foreign tropical plants for the hospital, which are carefully looked after by patients assigned to that work: *Telgairia*, *Taraktogenos kurzii*, *Hydnocarpus castanea*, *Hydnocarpus wightiana*, *Litchi clunensis*, *Lansium domesticum*, *Saigon mango*, *Kala alphonse mango*, *Garcinia livingstoniana*, *Garcinia mangostana*. In addition to the above, we have received some bud-wood of mango and avocado. The chaulmoogra oil trees were planted as an experiment to determine if the Isthmian soil and climate would be suitable for their culture on a larger scale.

Farm department.—There were 35 cripples on the farm at the close of the year. The services of all but 3 were utilized in the garden, cemetery, dairy, and piggery; these 3 were subsisted at the hospital free of charge (as are the others), and given a plot of land in the farm reservation to enable them to cultivate their own gardens. One of these 3 has demonstrated his ability to earn more money than he would have earned working for the hospital at a fixed rate of pay. This new method of employment encourages them to do their own work, makes them more ambitious, and lessens the burden of their support on the department.

Dairy.—The herd consists of 52 Jersey grade cows, and 30 calves; 16 Holstein cows, 7 calves, and 1 bull. On December 10 we received a young registered Holstein bull, which was presented by Mr. H. P. Wilson—one of the members of the Special Panama Canal Commission which visited the Zone during the summer. He had not been immunized against Texas Fever, and this was therefore done by the Board of Health Laboratory; we hope that he will recover safely from the procedure. This bull is a fine specimen of a pure bred Holstein and will make a splendid sire for our herd.

The milk has continued to be of a high standard as to fat contents, and in its low bacterial content. We continue to pasteurize the milk and it is examined at frequent intervals by the Board of Health Laboratory. Most of it is sold to the commissary and the balance is used by Ancon and Corozal hospitals.

Piggery.—There were 268 pigs remaining at the end of the year. During the latter part of December an epidemic of hog cholera broke out among the unvaccinated pigs and it became necessary to butcher a great many that were not attacked in order to prevent the spreading of the disease, as we were unable to get any serum on the Isthmus in time to save the healthy ones.

Garden.—All the cripples whose services can not be utilized for any other purpose are sent to the garden to raise vegetables. There

we have a nursery also from which we supply the quartermasters with various plants from time to time. Since the visit of Doctor Fairchild, he has been kind enough to send us budwood of avocados and mangoes which we have budded to some of the seedling trees, and at present we have 27 budded avocado and 10 budded mango trees, such as Bombay Yellow, Peters', Kavas Ji Patel, Kala Alphonse and Saigon mangoes, and Pollock, Simmonds and Dade avocados. We continue to compost manure and sell it to various gardens on the Isthmus.

General remarks.—There was 1 accidental death in the male service, as a result of an altercation between two disturbed patients. There were no suicides. The general health of the patients remains good. There were no changes in the organization during this calendar year, which favors our ability to continue the work with success.

COLON HOSPITAL.

(Maj. T. J. LEARY, U. S. Army, Superintendent.)

Hospital work.—The work went along nicely during the year. In spite of the reduction in Panama Canal forces which took place, the number of serious surgical operations we were called upon to do increased. Many such cases come to this hospital practically *in extremis*, as a result of the colored population first trying all sorts of nostrums and home remedies on the stricken one and then coming to the hospital as a last resort. During the latter half of the year the number of deliveries of colored women greatly increased, at times the rush of deliveries making it necessary to transfer some of the mothers and children to Ancon or Santo Tomas hospitals or to send them home before the expiration of the usual 10-day hospital period for such cases.

Statistical information is included in the tables in the latter part of this report.

Buildings.—These are generally satisfactory. It will be necessary to do a great deal of painting in and about the buildings during the coming year in spite of the fact that the hospital was freshly painted just 1 year ago. It has proven difficult to find a paint that endures on concrete walls under such conditions of climate and proximity to the sea—spray from the surf at times floats to the farthest part of the hospital. It is also worthy of noting that the reinforcement and concrete work of this hospital is not holding up well, possibly due to the fact that the reinforcing iron was placed too close to the concrete surface, where it can be acted on by moisture and salt air. Ward "A" of the old hospital group justified the small expenditures made upon its repair, by serving a very useful purpose in housing smallpox cases during the small outbreak of the past year.

Grounds.—The grounds have been kept in satisfactory condition throughout the year, and many trees of different varieties have been set out. The ambulance and service roads within the hospital grounds have been planted on either side with royal palms. The palms have all taken root and within a few years will add greatly to the beauty of the grounds. General appearances will be much improved when the dispensary section of the old hospital group is moved.

SANTO TOMAS HOSPITAL (Panama).

(Maj. EDGAR A. BOCOCK, U. S. Army, Superintendent.)

Administration.—The year 1921 has been a prosperous one for this hospital from a financial standpoint. The total income for the year amounted to \$305,952.78, of which \$204,562.79 represents Panama Government appropriations and donations, including the special appropriation of \$59,694.74 made to liquidate the balance of the old debt of the hospital to The Panama Canal, while the remainder of \$101,289.99 represents actual operating revenues. The total expenses for the year amounted to \$242,233.23, showing an excess of income over expenses of \$63,719.55. The current assets at the end of the year amounted to \$30,676.04, while the liabilities were \$18,306.96, leaving a net working capital of \$12,369.08, which would indicate that the institution is at present functioning on a perfectly sound financial basis. All outstanding debts have been canceled and current monthly bills are now paid as soon as they are presented. During the year the hospital has been registered and rated with R. G. Dunn & Co. of New York, and its credit reestablished, both in the United States and Europe, so that it is now possible to purchase practically any desired commodity in either place without making payment in advance.

The financial policy of the hospital has been to collect fees for services rendered, from every person who is able to pay, but to treat absolutely free of any charge all who were unable to pay for their care, invariably giving the benefit of treatment to the patient in case there is any question as to his pecuniary responsibility. In view of the fact that the National Government donates toward the support of the institution only the sum of \$12,000 monthly, which is barely half enough to cover actual expenses, it is absolutely essential that this policy be intensively followed or the institution would very soon develop an enormous debt that it would be unable to meet without outside assistance. It is not possible to decrease further the average annual expense without materially lowering the standard of work performed.

The auditing and property accounting department which was instituted in February, 1919, has been perfected and its scope enlarged with use until it is at present functioning efficiently and satisfactorily. Quarterly inventories are taken of all nonexpendable equipment. Stock cards are kept balanced to show at all times the actual amount and value of stock on hand.

During the year the question of procurement of supplies and equipment has been carefully studied with the purpose of being able to secure the best possible goods for the least expenditure of money. All orders for supplies are scrutinized and signed by the superintendent personally before purchase is made, and their actual receipt is verified by frequent inspections at the time of arrival.

During the year 218,278 rations were prepared and issued by the steward's department for the patients and personnel of the hospital. The average cost of each ration (doctors, nurses, and all patients) was 40 cents. The average cost of hospitalization for each patient, including subsistence and professional care, amounted to \$1.95 per day. The patients and personnel have been well fed and with few exceptions have been pleased and satisfied.

The hospital buildings, many of which are very old and practically unserviceable, have been repaired and repainted. In doing this repair work only such improvements have been made as were considered absolutely necessary to make these buildings habitable until the new Santo Tomas Hospital is completed. The maternity section, which was in the worst possible state for occupancy, has been entirely renovated during the year and is now in serviceable condition.

Many beds, tables, and other articles of furniture have been repainted and other repairs of equipment have been made by the hospital artisans during the year. All wooden legs, crutches, coffins, new furniture, etc., have been manufactured in the shops, while electrical and plumbing fixtures have been installed and repaired by the carpenter's force, thus obviating the employment of high-salaried mechanics for these purposes. The cost of maintenance of buildings and equipment for the year has amounted to \$4,664.01.

Professional services.—During 1921 all possible effort has been devoted to improving the professional service of the hospital, and while it is still far from being excellent, it is certainly advancing in efficiency and at present the patients are receiving fairly good medical attention and treatment. It has been the policy to admit and retain only the patients that were really hospital cases and to discharge, transfer, or repatriate, as rapidly as convenient, all incurables, insane, and long-standing chronic cases, thereby making room for more needy acute cases. On this account it has been possible to give better and more efficient care to patients who have a chance of recovery and at the same time to prevent the hospital from becoming an asylum for incurables. A total of 9,150 patients was admitted for treatment during the year; 124,438 days relief have been furnished, making the average number in hospital 344 patients daily. Of the total treated, 749 died, 111 were transferred to other hospitals, and 7,890 were discharged. The average length of stay in the hospital was 9 days.

During the year there were 7,324 cases treated by the medical service. There were 1,723 major operations, and 2,839 minor operations performed by the surgical service. In the dental clinic 2,762 treatments were given and 1,172 teeth extracted. The hospital laboratory performed 631 autopsies, 5,523 Wassermanns, 8,158 uranalyses, 2,046 blood examinations, 187 chemical analyses, and 8,745 miscellaneous examinations.

In addition to caring for all drugs and medical supplies for the hospital, the pharmacy filled 11,361 prescriptions for dispensary patients and furnished all of the wholesale drugs used by the various departments of the National Government and a few other organizations.

On March 1, 1921, the maternity service of the hospital was reorganized and a pre-natal and post-natal clinic established in connection with this department. Since that date, 1,781 expectant mothers and 659 children have been examined in this clinic, while 987 babies have been delivered in the ward. The number of babies born dead and dying after birth during the period under consideration was 74, as compared with 120 for the same period last year.

The dispensary, which is also the admission department, is one of the most important branches of the institution. In this office there were 8,972 consultations, 12,304 surgical dressings, and 2,318 vaccina-

tions, in addition to examining and passing upon all patients who were admitted to the institution. The ambulance service, which operates under the above department, made 1,741 calls during the year.

A total of 1,566 cases were handled by the X-ray department; 3,829 plates and 701 dental films were used; 126 X-ray treatments were given to hospital and outside patients.

During the year 5,347 patients were examined and treated in the eye, ear, nose, and throat clinic; 211 operations on these cases were performed, 21 refractions were done, and 1,368 prescriptions furnished to clinic patients.

The venereal clinic and genito-urinary department have continued to perform good service, but on account of various unavoidable difficulties, the examination of prostitutes—required by Panamanian law—has not been satisfactorily carried out. The number of new cases admitted to this department has been 2,163, of which 1,795 were males and 368 females. There were 1,327 consultations and 18,421 treatments given; 1,498 injections of salvarsan, 2,351 injections of mercury, and 517 surgical operations have been performed on venereal patients. Wassermann tests have been done as a routine measure on all patients admitted to the hospital, and salvarsan administered in all cases of positive reaction by the genito-urinary service. When patients have been in need of salvarsan and unable to pay for it, it has been administered without cost; 973 free injections have been furnished during the year.

An effort has been made to keep in line with newer professional developments. During the year Ambrine has been used in the treatment of all burn cases in the hospital, with gratifying results. Local anesthesia by the use of magnesium sulphate has been tried by the surgical staff and offers promise of being desirable in selected cases. An ultra-violet ray machine has been secured and used on selected cases of skin diseases, chronic ulcers, and superficial pathological conditions. This apparatus seems to offer hopes of cure in a selected group of cases.

The Canal Zone Medical Association met at this hospital twice during the year and several interesting and instructive papers were read by the staff of the institution. A series of tubercular patients have been treated with the ethyl ester of chaulmoogra oil, and it has been observed that this drug does not offer the same ray of hope for the cure of the "white plague" as it does in leprosy.

Conclusion.—The administration of the hospital has shown improvement during the year in developing financial stability; in promptness in the payment and collection of bills; in efficiency and accuracy in the auditing and property accounting and in all matters pertaining to the business department of the institution. Likewise, the professional service has shown improvement, but not so marked as has been desired. The principal difficulty in managing the professional service is the lack of sufficient well-trained personnel in the way of doctors and nurses. At Santo Tomas Hospital only a limited and fixed number of doctors and nurses are allowed. No others are available without being procured from a great distance. Consequently upon the resignation, sickness, or discharge of one of these employees, it follows that no other is available to fill the vacancy for a considerable period of time, making it impossible to maintain the desired efficiency during the temporary shortage.

Owing to the necessity for using pupil nurses in place of graduates, with only a limited number of head nurses to supervise their work, it is impossible to care for the patients in a manner that is to be desired. Pupil nurses with limited training are of value, but they can not be depended upon to handle the nursing of seriously ill patients in a manner which is either creditable or desirable. Everything possible has been done to improve the training school here and to provide a better theoretical and practical course so that the undergraduates will become more efficient as time goes on, but as yet they are far from being competent trained nurses and since they must be used to a large extent in this institution, the professional service must naturally suffer.

PALO SECO LEPROS COLONY.

(Mr. F. D. TUCKER, Superintendent.)

(Dr. PHILIP HORWITZ, Attending Physician.)

During the year there were 11 admissions, 5 deaths, 1 repatriation (to St. Vincent), and 1 escape, leaving at the end of the year 78 patients of whom 72 were black, 3 Chinese, and 3 white (Panamanians). The average age of admission was 33 years for the males, and 46 for the females. The average length of time sick with leprosy prior to admission was 15 months for the males and 30 months for the females. Two of the admissions were of the nerve type, 4 tubercular, and 5 mixed.

The average age at death was 44 for males and 52 for females; the average length of time suffering with leprosy prior to death was $3\frac{1}{2}$ years for males and 5 years for females.

Of the 78 patients remaining at the end of the year, 55 were male, and 23 female.

An average of 25 patients were employed, at from 5 cents to 14 cents per hour. Local products raised by the patients were purchased for use of the colony, amounting to \$965, and cash allotments were distributed to the amount of \$1,384.50. The total income of the inmates was \$4,740 for the year—a monthly average per patient of \$5.18. Cash sales at the local store operated by the asylum, amounted to \$3,619.

The planting of trees and shrubs was continued, mangoes, papaya, and palms being set out, a pineapple garden started and all the mango, orange, and lime trees cleaned of parasitic vine growths. A new rowboat was built to replace one worn out in service. A small house formerly used for a school building was remodeled to serve as quarters for 2 married inmate couples. All repairs and upkeep of houses, furniture, and launch, and all plumbing, painting, and carpenter work, and replacements on our water and sewer lines were completed by our own laborers.

The piggery has been kept up through the year, the animals being cared for by patient labor and fed by scraps from the patient dining room and kitchen and vegetables from the colony. Nine pigs were killed for food during the year, and 4 were sold to patients for raising. At present there are 32 pigs on the farm.

Moving picture exhibitions were given weekly. Several dances were held by the patients, and entertainments were given by outside talent. National holidays were celebrated and were greatly enjoyed,

Christmas being especially successful, due to the generosity of friends in the United States and gifts from local individuals and fraternal orders.

Three leper couples were granted permission to marry, and the ceremonies performed at the asylum chapel.

A new ward building was built for use of mentally deranged patients. It has 2 wards, each accommodating 4 beds, and 4 single rooms, strongly constructed, for the more violent cases. These small rooms can also be used as detention cells for those guilty of misdemeanors and other infractions of discipline.

The deficient water supply of the colony has always been a matter of concern. A new well was dug 28 feet deep alongside the present drilled well. A fairly abundant supply of water was struck below a depth of 12 feet, and from the bottom of this well infiltration galleries were dug in two directions, one of them tapping into the casing of the drilled well. However, it developed that there was a leak somewhere in the lower part of the drilled well and but little of the extra supply was after all made available for use. If it proves impossible to locate and stop this leak it will ultimately be necessary to seek a new source of water, possible on the opposite slope of the ridge back of the colony, at which point the subsoil drainage seems to outcrop.

On August 1, 1921, a visiting physician was assigned to the colony, since which time he has made daily visits there, assuming full charge of and responsibility for the treatment of patients. His preliminary work embraced the installation of permanent records of the patients' conditions, detailed physical examination, histories, close-up photos of lesions and deformities; routine laboratory examinations of blood, urine, stool; Wassermann examinations of blood and spinal fluid, bacteriological examination of discharges and lesions, etc.

During the clinics that are held daily, non-leprous affections, as helminthiasis, anemias, cardiovascular-renal complications, etc., as well as indolent leprous ulcers, neuralgias, eye affections, etc., receive appropriate treatment. Those suffering with more serious complications are kept in the dispensary building where they are practically under continuous observation throughout their course of treatment.

Specific treatment consists of weekly intra-muscular injections of the ethyl esters of chaulmoogra oil to all patients, replacing the oral administration of the crude oil—the action of which was indefinite and which was not taken by a large number of inmates. The Board of Health Laboratory, Ancon, manufactures all the ethyl esters from the crude oil, at a cost far less than they can be purchased for.

The results that are being obtained, though varying considerably with the individuals, have been rather gratifying. Skin lesions are decreasing in size, exudations are drying up, neuralgias are almost entirely absent; sensation is gradually returning to those affected with skin anesthetics, and slight motion to those with muscle paralysis; eye lesions are improving. Ulcerations treated by combined specific and local treatment are doing remarkably well. The physical and psychic conditions of the patients are greatly improved. So far no serious ill-effects whatsoever have been encountered from the use of this specific medication. Although the short time the treatment has been instituted precludes the formation of a definite prognosis as to the final outcome, the results thus far obtained may be termed highly satisfactory.

BOARD OF HEALTH LABORATORY.

(Dr. L. B. BATES, Chief of Laboratory.)

(Operated in connection with Ancon Hospital.)

The general scope of the work performed at the Board of Health Laboratory during the calendar year 1921 has not differed materially from that done in 1920. The staff has been reduced during the year, 1 technician being discharged on July 31 and the entomological department being discontinued on August 31.

Relapsing fever.—During the early part of the year there were 6 boys sick in Ancon Hospital with relapsing fever. These boys had recently slept in a hut in a native town outside the Canal Zone while on a hunting expedition and it was thought that they might have contracted the infection in this hut. The entomologist made an inspection trip to the village and carefully examined both the hut and the bed. He found the bed, which was a bamboo affair, heavily infested with human ticks, *Ornithodoros talaje*. About 300 of these ticks were brought back to the laboratory for further study.

These ticks were found to be harboring the relapsing fever spirochæte, and with the assistance of 3 young white Americans, soldiers from a neighboring military camp, who volunteered to be inoculated with the disease, these ticks were also proved to be transmitting agents of the disease. This work was described in full in the July, 1921, number of *The American Journal of Tropical Medicine*. The results were summarized as follows:

"Two white rats have been infected with relapsing fever by inoculating them with a suspension of macerated, naturally infected ticks, *Ornithodoros talaje*.

"Typical spirochætes have been found in naturally infected ticks in Panama.

"One monkey, *Macacrus rhesus*, has been infected with the relapsing fever of Panama by feeding a number of larvæ (*O. talaje*) upon an infected white rat and 22 days later allowing the same ticks as first stage nymphs to feed on the monkey.

"Three human beings, volunteer patients, have been infected with relapsing fever as follows:

"1. The first by a subcutaneous injection of blood from a white rat which had been infected with relapsing fever by a combined subcutaneous and intraperitoneal injection of naturally infected ticks.

"2. The second by a hypodermatic injection of a suspension of naturally infected ticks.

"3. The third by being bitten by naturally infected ticks."

Dysentery.—During the past year we have classified and reported dysentery bacilli by "Group" according to the scheme recommended by Thjotta.⁶

Group I. (*Bacillus* of Shiga).

Group II. (Flexner, Y, Strong, types).

Group III. (*Bacillus* of Sonne).

The reason for the adoption of this scheme is well-explained by Thjotta:

⁶ Thjotta, Th., "On the Bacteriology of Dysentery in Norway." *Journ. of Bact.*, Vol. IV, No. 4, July, 1919.

"The new grouping I, II, and III will be in full accordance with the chronology of the dysentery bacilli, the Shiga type being the first isolated, then the strains belonging to the old types Y, Flexner and Strong, and at last the new type of Sonne. Furthermore, this mode of grouping will simplify the nomenclature by omitting all the names of authors and neglecting the smaller, insignificant variations of the strains that have given rise to all the different old "types." The new grouping will also bring the Shiga type close up to the other dysentery bacilli, and thereby put an end to such illogical names as pseudodysentery bacilli, paradysentery bacilli, atoxic bacilli, etc., and render it unnecessary to use such long names as mannite fermenting or nonmannite fermenting types."

During the year an organism closely corresponding to the Group III bacillus has been isolated from 17 patients. This bacillus has been recovered both during life and at autopsy, and has been accompanied by dysenteric lesions of various gradations from the very mildest to those of a moderately severe type. Although this bacillus differed slightly from the described Group III bacillus of Sonne, it came so much nearer to this group than to the organisms included in Group II that it was considered and reported as a Group III organism.

Bacillus typhosus.—Recovered in blood cultures from 25 individuals; 9 of these patients were from shipboard and 16 from the Canal Zone or Republic of Panama. *B. paratyphosus* A was recovered twice in blood culture, 1 patient coming from a ship, the other from Panama. In addition, 2 patients, 1 from the Canal Zone and 1 from shipboard, had sterile blood cultures but positive *B. typhosus* stools.

Typhoid carriers.—On December 31, 1920, two *B. typhosus* carriers were under sanitary surveillance, H. B., a colored laborer and A. V., a colored woman, an inmate of Corozal Hospital. One additional carrier was detected during the year, G. H., a Chinaman who was a cook at one of the military camps. Cholecystectomies were performed on 2, A. V. and G. H. A. V. apparently recovered from the carrier state; G. H. still remains a carrier. This left 2 carriers under surveillance on December 31, 1921, H. B. and G. H.

Glanders.—The laboratory has no knowledge of glanders, either human or animal, having been encountered or suspected on the Canal Zone from the time of the American occupation to January 1, 1921.

During January, 1921, the mallein test was performed on all the U. S. Army mules and horses on the Isthmus, which number totaled 1,520. The prescribed dose of 0.10 c. c. mallein intradermatically was used in these tests. Eight of these showed either suspicious or positive reactions and the Department Veterinarian requested the laboratory to perform the glanders complement deviation test on the blood of these animals.

All animals which showed positive mallein reactions also gave positive complement deviation tests. These 8 animals (7 mules and 1 horse) were killed and a complete autopsy performed on each. Five of the animals (1 horse and 4 mules) revealed one or a sparse number of encapsulated chronic lesions that conformed to the description of Duval and others for chronic glanders, or subacute lesions due to a virulent strain of the organisms. Contrary to the usual location of the lesions in the nasal and respiratory tracts, nearly all lesions found were in the liver, its neighboring lymph nodes, and the perito-

neum of the cæcum. No case revealed many lesions and all of them that were examined were found thoroughly encapsulated so that it is believed that none of the lesions taken for microscopic examination were capable of disseminating the disease. However, it is possible that small lesions of microscopic size may have been overlooked in selecting pieces of tissue at autopsy for the microscopic examination.

Guinea pigs inoculated with tissue from 2 of these animals (mules) and a guinea pig inoculated with a culture obtained from a third (also a mule) all developed lesions similar to those of glanders.

Blackleg.—Cattlemen on the Isthmus state that blackleg is not uncommon in the interior of the country, and that they have been on the watch for it on the Canal Zone. Early in the year, the Cattle Industry foreman in charge of the Far Fan pastures detected 3 cases. The lesions in these cases were typical and the *Bacillus chauvæi* (blackleg bacillus) was recovered from each.

Blood chemistry.—The demand for chemical analysis of the blood by the clinicians has greatly increased during the past year. In nephritis, diabetes, pregnancy with complications, and in undiagnosed or obscure conditions it has become practically a routine procedure.

Chaulmoogra esters.—All the lepers at the Palo Seco Leper Colony have been placed under treatment with the ethyl esters of chaulmoogric acid during the past year. The chemical laboratory has prepared these esters quite economically as needed.

Loan to Department of Agriculture.—The exclusive use of one laboratory room and various laboratory conveniences have been extended to the U. S. Department of Agriculture, which has maintained a temporary field station here with a personnel of one specialist in tropical entomology, Mr. James Zetek, and one entomological laboratory assistant, Mr. Ignacio Molino.

Photography.—All the photographic resources of the laboratory and a certain amount of technical help have been placed at the disposal of the physician assigned to the care of the lepers at Palo Seco during the past year. He has taken approximately 258 photographs of lepers before and while under treatment with chaulmoogric acid esters.

During the year approximately 32,000 reports have been rendered. This includes duplicates where the same were requested.

BACTERIOLOGICAL REPORT.

Blood cultures.....	358
<i>B. typhosus</i>	27
<i>B. paratyphosus A</i>	2
<i>B. dysenteriae Group III</i>	1
<i>B. coli</i>	8
<i>B. coli communior</i>	1
<i>B. coli communis</i>	1
<i>Pneumococcus Type I</i>	6
<i>Pneumococcus Type II</i>	7
<i>Pneumococcus Type IV</i>	4
<i>B. influenzae</i>	1
<i>B. pyocyaneus</i>	1
<i>Streptococcus viridans</i> (5 cases).....	6
<i>Streptococcus nonhemolytic</i>	2
<i>Streptococcus hemolyticus</i>	3
<i>Staphylococcus albus</i>	2
<i>Staphylococcus aureus</i>	7

BACTERIOLOGICAL REPORT—continued.

Stools cultured for typhoid-dysentery group.....		1,525
Positive stool cultures.....	116	
<i>B. typhosus</i> (26 cases).....	29	
<i>B. typhosus</i> on carriers (3 carriers).....	28	
<i>B. paratyphosus B.</i>	1	
<i>B. dysenteriae, Group II.</i>	15	
<i>B. dysenteriae, Group III</i> (17 cases).....	40	
<i>B. dysenteriae</i> , unclassified (2 cases).....	3	
Urines cultured for typhoid group.....		599
Positive for <i>B. typhosus</i>	4	
Urines cultured for organisms other than typhoid group.....		330
Positive urine cultures (144 of these <i>B. coli</i>).....	194	
Throat cultures for <i>B. diphtheriae</i>		1,623
Positive for <i>B. diphtheriae</i> (62 cases).....	137	
Nasal cultures for <i>B. diphtheriae</i>		164
Positive for <i>B. diphtheriae</i>	3	
Throat cultures for organisms other than <i>B. diphtheriae</i>		53
Spinal fluid cultures.....		129
Positive spinal fluid cultures.....	24	
<i>B. influenza</i> (5 cases).....	11	
<i>B. influenza</i> and <i>Staphylococcus albus</i> (1 case).....	2	
<i>Pneumococcus</i> Types I and II.....	1	
<i>Pneumococcus</i> Type II.....	2	
<i>B. coli</i>	1	
<i>Meningococcus</i> (1 case).....	3	
<i>Staphylococcus aureus</i>	1	
<i>Staphylococcus aureus</i> and <i>B. mucosus capsulatus</i>	1	
<i>Staphylococcus albus</i>	2	
Knee fluid cultures.....		16
Sputum cultures.....		151
Naso-pharyngeal cultures (292 cases).....		687
Positive naso-pharyngeal cultures.....	73	
<i>Meningococcus</i> (21 cases).....	71	
<i>Meningococcus</i> carriers (1 case).....	2	
Ear cultures.....		83
External ear cultures.....		2
Mastoid cultures.....		22
Eye cultures.....		15
Cultures from skin lesions.....		9
Autopsies cultures.....		94
Organs, exudates, etc.....	372	
Surgical tissues cultured.....		8
Pus from frontal sinus.....		4
Balanitis pus.....		2
Pus from epididymis and tunica vaginalis.....		1
Pus from furuncle.....		2
Pus from urethral discharge.....		1
Pus from stomach lavage.....		1
Culture from abscess of jaw.....		1
Culture from abscess on thumb.....		1
Culture from abscess of upper eyelid.....		1
Culture from abscess back of left ear.....		1
Culture from abscess back of neck.....		1
Culture from abscess under right arm.....		1
Culture from abscess on right arm near elbow.....		1
Culture from abscess on scalp.....		1
Culture from cervical gland.....		1
Culture from suppurative gland on neck.....		1
Culture from salivary gland.....		1
Milk cultured for bacteria count.....		1,347
Ice cream cultured for bacteria count.....		3
Dark field examinations.....		259
Positive for <i>Treponema pallidum</i>	31	
Positive for <i>Treponema pertenue</i>	2	
Conjunctival smears.....		68
Urethral smears.....		79
Vaginal smears.....		32
Throat smears.....		173
Positive for <i>fusiform bacillus</i> and <i>spirilla</i> of Vincent's Angina.....	57	
Sputum for <i>B. tuberculosis</i>		181
Positive for <i>B. tuberculosis</i>	22	
Urine examined for <i>B. tuberculosis</i>		12

BACTERIOLOGICAL REPORT—continued.

Spinal fluid examined for <i>B. tuberculosis</i>	6
Positive for <i>B. tuberculosis</i>	1
Examinations of leper suspects.....	29
Positive for <i>B. lepræ</i>	9
Autogenous vaccines prepared.....	114
Feces examined for parasites and ova.....	204
Blood films examined for malarial parasites.....	1,065
Positive for <i>Tertian malarial parasites</i>	207
Positive for <i>E. A. malarial parasites</i>	84
Positive for <i>Quartan malarial parasites</i>	1
Blood films examined for relapsing fever.....	12
Positive for spirochaetes of relapsing fever.....	8
Blood films examined for <i>B. anthracis</i>	1
Cultures from bread.....	6
Cultures from gall-bladder fluid.....	2
Culture of kippered herring.....	1
Culture of cane sugar syrup.....	1
Culture for Ducrey's bacillus.....	1
Culture from tongue for sprue.....	1
Culture from gums.....	2
Culture from palate.....	1
Examinations of skin scrapings.....	1
Tinea of beard.....	1
Serum from abscess.....	1
Purulent exudate from abdominal cavity.....	1
Smears and cultures of cases of pyorrhea alveolaris.....	2
Solution of argyrol for culture.....	1
Smallpox vaccine examined, tubes.....	10
Culture from frontal sinus.....	3
Culture from maxillary sinus.....	1
Culture of gauze drain.....	1
Culture of scarlet fever suspect.....	1
Fluid from nose for identification (1 case).....	2
Examination for scabies (1 family).....	7
Can of ripe olives for <i>B. botulinus</i>	1
Fluid from alligator pears.....	2
Material on glass slide from Colombia for <i>B. typhosus</i>	1
Specimens of water from Balboa swimming pool.....	60
Specimens of water from faucet, Board of Health Laboratory.....	4
Culture of river water.....	1
Examination for occult blood.....	1

DARK FIELD EXAMINATIONS, 1920 AND 1921, AND WASSERMANN
TESTS ON ALL CASES.

Positive for <i>Treponema pallidum</i>	62
Negative for <i>Treponema pallidum</i>	336
Total.....	398

Positive dark fields.

Wassermann test positive.....	23
Wassermann test negative.....	28
No Wassermann test.....	11
Total.....	62

Negative dark fields.

Wassermann test positive.....	33
Wassermann test negative.....	257
No Wassermann test.....	46
Total.....	336

Spirillæ and fusiform bacilli similar to those seen in Vincent's angina were recovered from venereal lesions in 8 patients.

⁷ Six had received local treatment.

Bacteriological report (animals).

Cattle ears (9 positive for <i>B. anthracis</i>).....	37
Cattle spleens (2 positive for <i>B. anthracis</i> ; 3 positive for <i>B. chauvæi</i>).....	17
Muscle from cattle (1 positive for <i>B. chauvæi</i>).....	2
Rabbit spleens (2 positive for <i>B. paratyphosus B</i>).....	2
Guinea pig spleens (32 positive for <i>B. paratyphosus B</i>).....	47
Cattle intestine.....	1
Autopsies cultured.....	103

Bacteriological report (serology).

Wassermann tests.....	14,121
Agglutination tests.....	155
Examination of blood for coagulation time.....	8
Blood sera prepared by Swift-Ellis method for intraspinal injection.....	10
Blood typing for transfusion.....	10
Blood count, differential.....	1

WASSERMANN REACTIONS DURING THE YEAR 1921.

During the year 14,121 Wassermann tests were performed on 9,306 persons. The results of these tests are summarized in the following tables:

	Positive.	Negative.	Total.	Per cent positive.
White, civil:				
Males.....	236	1,851	2,087	11.30
Females.....	30	261	291	10.30
Children.....		31	31	.....
White, soldiers, males.....	241	2,226	2,467	9.76
Totals.....	507	4,369	4,867	10.39
Spanish and white natives:				
Males.....	68	364	432	15.74
Females.....	38	171	209	18.18
Children.....		21	21	.....
Totals.....	106	556	662	16.01
Blacks and mulattoes:				
Males.....	498	1,562	2,060	24.17
Females.....	296	1,064	1,360	21.76
Children.....	27	276	303	8.91
Totals.....	821	2,902	3,723	22.05
Chinese, males and females.....	8	37	45	17.77
Grand totals.....	1,442	7,864	9,306	15.49

In addition, Wassermann tests were made on 440 spinal fluids from as many individuals, and of these 150, or 34.09 per cent, were positive.

PATHOLOGICAL.

During the year 289 autopsies were performed at the Board of Health Laboratory. The causes of death were as follows:

General diseases.

Typhoid fever.....	1
Paratyphoid fever.....	1
Malarial fever, estivoautumnal.....	2
Malarial fever, mixed.....	1

General diseases—Continued:

Hemoglobinuric fever, malarial.....	1
Smallpox and alastrim.....	2
Measles, gangrenous stomatitis a sequel.....	1
Scarlet fever.....	1
Influenza (pneumonia).....	3
Influenzal meningitis.....	7
Dysentery, bacillary.....	8
Purulent infection and septicemia (streptococcus).....	3
Pyemia, staphylococcus.....	1
Pellagra.....	2
Tuberculosis of the lungs.....	19
Acute miliary tuberculosis.....	2
Tuberculous meningitis.....	2
Pott's disease.....	1
Tuberculous pericarditis.....	1
Tuberculosis of the genito-urinary system.....	2
Disseminated tuberculosis.....	10
Syphilis, tertiary.....	5
Syphilis, cerebrospinal.....	4
Syphilis, hereditary.....	1
Cancer of the jaw and mouth.....	1
Cancer of the stomach.....	2
Cancer of the female genital organs.....	1
Cancer of the breast.....	1
Cancer of the prostate gland and bladder.....	1
Cancer of the lung and pleura.....	1
Diabetes.....	3
Acute lymphatic leukemia.....	1
Chronic morphinism, nephritis, etc.....	1
Total.....	93

Diseases of the nervous system and of the organs of the special senses.

Cerebrospinal fever.....	1
Pneumococcus meningitis.....	2
Progressive bulbar paralysis.....	1
Cerebral hemorrhage, apoplexy.....	4
Softening of the brain.....	2
General paralysis of the insane.....	10
Epilepsy (pontine hemorrhages and pulmonary edema).....	2
Tumor of the brain.....	1
Otitis media and mastoiditis.....	6
Total.....	29

Diseases of the circulatory system.

Endocarditis, malignant.....	2
Endocarditis, chronic.....	4
Organic disease of the heart.....	9
Stokes-Adams disease.....	1
Angina pectoris.....	1
Aneurysm.....	2
Thrombotic softening of the brain.....	1
Embolism and thrombosis.....	1
Thrombosis and fibrous obliteration, superior longitudinal sinus.....	1
Total.....	22

Diseases of the respiratory system.

Abscess, post-nasopharyngeal.....	1
Bronchopneumonia.....	3
Lobar pneumonia.....	7
Pneumonia unresolved and empyema thoracic.....	1
Gangrene of the lungs.....	3
Total.....	15

Diseases of the digestive system.

Stomatitis and oesophagitis, acute.....	3
Diarrhoea and enteritis (under 2 years).....	2
Colitis (under 2 years).....	2
Appendicitis, gangrenous, perforative.....	2
Duodenal ulcer.....	2
Cirrhosis of the liver.....	1
Abscess of the liver, entamebic.....	1
Splenomegaly, afebrile (pseudo Banti's disease).....	1
Pancreatitis, acute.....	3
Total.....	17

Nonvenereal diseases of the genito-urinary system and annexa.

Acute nephritis.....	1
Chronic nephritis (Bright's disease).....	5
Pyelo-nephritis.....	1
Stricture of the urethra and extravasation of urine.....	1
Fibro-myomata-uteri. Hemorrhage from uterus.....	1
Salpingitis and peritonitis.....	1
Total.....	10

The puerperal state.

Rupture of full term pregnant uterus, pituitrin contributory.....	1
Toxemia of pregnancy.....	1
Eclampsia.....	2
Total.....	4

Diseases of the skin and of the cellular tissue.

Cellulitis of the scalp, neck and shoulder.....	1
---	---

Diseases of the bones and of the organs of locomotion.

Osteoperiostitis and osteomyelitis, acute.....	1
Acute arthritis, <i>Streptococcus viridans</i>	1
Total.....	2

Malformations.

Congenital malformation of the heart and vessels.....	2
---	---

Diseases of early infancy.

Premature birth.....	9
Congenital debility.....	2
Malnutrition.....	33
Hemophilia neonatorum.....	2
Accidents of labor, cerebral hemorrhage.....	2
Hydrocephalus and hemorrhage into ventricles.....	1
Total.....	49

Affections produced by external causes.

Suicide by drowning.....	1
Methyl alcohol poisoning.....	1
Accidental poisoning by mercury and oxalic acid.....	1
Accidental drowning.....	1
Traumatism by firearms.....	1
Traumatism by a fall.....	1
Railroad traumatism.....	2
Traumatism by motor vehicle crushings.....	4
Homicide by firearms.....	1
Homicide by blow on head.....	1
Accidental suffocation in bed.....	1
Other forms of external violence.....	1
Total.....	16

Ill-defined diseases.

Undetermined..... 1

Appendix.

Stillbirths..... 21
 Nonviable fetus..... 7
 Total..... 28
 Grand total..... 289

The most frequent causes of death found at autopsy for the year were:

	Cases.	Per cent.
Tuberculosis.....	37	12.8
Malnutrition in infants.....	33	11.4
Syphilis, various forms.....	26	9.0
External forms of violence.....	16	5.5
Organic heart diseases.....	13	4.5
Pneumonia (influenza excepted).....	11	3.8
Influenza (pneumonia, meningitis).....	10	3.4
Dysentery, bacillary.....	8	2.7

Table showing the more common causes of death found at autopsy in the Board of Health Laboratory.

Date.	Number of autopsies per year.	Pneumonia.	Tuberculosis.	Hemoglobinuric fever, malaria.	Affections produced by external causes.	Chronic nephritis.	Combined types of dysentery.	Organic heart disease.	Typhoid.	Diarrhea and enteritis (in children).	Cancer.
1904.....	6	1	1								
1905.....	269	60	9	27	3	8	5	3	9		2
1906.....	509	191	22	50	24	23	39	15	33		2
1907.....	496	156	35	27	40	27	36	12	58	4	4
1908.....	361	59	63	46	26	25	23	11	14		7
1909.....	295	55	37	26	32	31	11	17	11	1	5
1910.....	451	50	91	52	30	37	36	16	10	6	4
1911.....	508	83	102	41	38	36	19	20	9	11	11
1912.....	425	53	79	23	37	27	15	22	6	7	11
1913.....	460	47	89	21	34	26	8	26	5	23	12
1914.....	375	36	78	6	38	12	6	27	5	14	3
1915.....	328	28	56	14	20	12	5	14	2	15	10
1916.....	323	25	81	8	17	20	7	10	6	9	7
1917.....	330	24	51	5	21	23	3	18	1	3	5
1918.....	253	38	68	6	6	12		8		1	5
1919.....	324	22	55	3	15	14	3	20	3	10	11
1920.....	334	⁸ 46	55		29	11	5	16			6
1921.....	289	14	37	4	16	5	8	17	2	4	7
Totals...	6,336	988	1,009	359	426	349	229	272	174	108	112

⁸ This includes 32 cases of influenza.

Table showing number of autopsies performed revealing the following diseases per year.

Date.	Autopsies performed per year.	Yellow fever.	Beriberi.	Ankylostomiasis.	Tetanus.	Infectious diseases of children.	Plague.	Smallpox.
1904	6							
1905	269	12	7	7	2		1	
1906	509	1	5	4				
1907	496		1	2	1			
1908	361		1	2	3			
1909	295	2					1	
1910	451	2						
1911	508		1	1	1		1	
1912	425	1			1	4		
1913	460			2	3	1		
1914	375		1		4	2		
1915	328	3	1		2	1		
1916	323		2			3		1
1917	330		7		1	2		
1918	253			2		3		
1919	324	2				3		
1920	334					1		
1921	289					2		2
Totals.....	6,336	23	26	20	18	22	3	3

* Scarlet fever.

Four hundred and ten bodies passed through the laboratory during the year 1921 of which 289, or 70.5 per cent, were autopsied.

MALARIAL CARRIERS FOUND AT AUTOPSY (EXCLUDING DEATHS DUE TO MALARIA).

Cases.	Cases.
January.....	August.....
February.....	September.....
March.....	October.....
April.....	November.....
May.....	December.....
June.....	
July.....	Total.....
	13

Two hundred and eighty-nine autopsies minus 4 deaths due to malaria shows 18 out of 285 cases with pigment and parasites in deep organs, or 6.3 per cent.

Their local residences were as follows:

Panama Canal suburbs.....	11	Las Cascadas.....	1
Palo Seco.....	1	Gatun.....	1
Empire.....	2	Colon.....	1
Gamboa-Caimito.....	1		

Their races were as follows:

Panaman.....	10	Chinese.....	1
West Indian negro.....	5	American, white.....	1
Porto Rican.....	1		

Syphilis.—There were 59 cases in the 289 autopsies who had responded in a positive manner to the Wassermann test, or 20.4 per cent.

Intestinal parasites.—There were 47 cases in the 289 autopsies showing one or more forms of parasites, or 16.2 per cent.

Ascaris.....	10	Strongyloides.....	5
Tricocephalus.....	12	Oxyuris.....	2
Uncinaria.....	18		

In addition, there were 2 Chinamen with *Clonorchis sinensis* in the biliary and intestinal tracts.

Typhoid carriers.—*B. paratyphosus A* in 1 case and *B. paratyphosus B* in 1 case.

Leprosy.—There were 5 lepers in the autopsy series. Their causes of death being: Pancreatitis and gallstones (2); duodenal ulcer and uncinariasis (1); cancer of the tongue and jaw (1); osteoperiostitis, diabetes, and syphilis (1).

Glycosuria.—There were 23 cases with a glycosuria. All but 6 of them were slight findings in infantile cases of malnutrition.

Microscopic examinations and reports on surgical specimens.

Tonsils (pairs).....	261
Tonsils (pairs) and adenoids.....	220
Adenoids.....	18
Specimens from eye or eyelid.....	20
Specimens from nose (nares).....	72
Specimens from nose (cutaneous).....	4
Specimens from external ear and canal.....	9
Specimens from middle ear and mastoid.....	3
Specimens from skin of face (nose and ear excepted).....	6
Specimens from oral cavity (tonsils and adenoids excepted).....	8
Specimens from skin of back.....	7
Specimens from skin of abdomen and buttocks.....	9
Specimens from perineum and anus.....	2
Specimens from skin of external genitalia (cutaneous).....	11
Specimens from skin of upper extremities.....	10
Specimens from skin of lower extremities.....	7
Specimens from skin of scalp.....	1
Specimens from larynx and trachea.....	3
Specimens from the oesophagus.....	2
Specimens from the stomach.....	1
Specimens from the intestines.....	9
Appendices.....	193
Salivary glands.....	1
Thyroid glands.....	5
Uterus and appendages.....	44
Cervix uteri.....	4
Tubes and ovaries.....	19
Tubes.....	41
Ovaries.....	34
Specimens passed from or taken from the uterus.....	28
Spermatic cord.....	6
Epididymis.....	3
Testicle and cord.....	10
Kidneys.....	4
Specimen from bladder.....	1
Prostate gland.....	1
Mammary glands.....	15
Gall bladder.....	9
Specimens from muscles.....	2
Specimens from bones.....	2
Veins, specimen from.....	1
Spleen, resected.....	1
Specimen from liver.....	1

Microscopic examinations and reports on surgical specimens.—Contd.

Sinus of abdominal wall.....	2
Blood for parasite search.....	2
Fluid from thorax for tumor cell search.....	1
Lymph nodes, cervical.....	8
Lymph nodes, inguinal.....	8
Lymph nodes, femoral.....	2
Lymph nodes, axillary and supraclavicular.....	3
Lymph nodes, abdominal cavity.....	3
Autopsy sets of tissue (Colon, 54 and Santo Tomas, 1).....	55
Total.....	1,192

PRINCIPAL LESIONS ENCOUNTERED IN SURGICAL SPECIMENS OTHER THAN
INFLAMMATORY.

Malignant tumors (cancer) (repeated specimens same case excluded).

Breast.....	10
Face (skin).....	6
Cervix and uterus.....	6
Oesophagus (specimen repeated).....	2
Metastases to lymph nodes.....	2
Intestine.....	2
Tongue and jaw.....	2
Liver.....	2
Gall bladder and ducts.....	1
Kidney.....	1
Hand (skin).....	1
Rib.....	1
Hip bone (ilium).....	1
Eyelid.....	1
Ovary.....	1
Scalp.....	1
Stomach.....	1
Mouth, hard palate.....	1
Larynx.....	1
Ear, external.....	1
Total.....	44

Benign tumors.

Uterus (fibro-miomata).....	27
Cysts of ovary.....	19
Moles, warts, etc.....	12
Polyp of nasal mucosa.....	7
Lipomata.....	5
Cystic thyroid glands.....	5
Tumors of the breast.....	4
Tumors of the testicle.....	2
Sebaceous cysts.....	2
Polyp of the endometrium.....	1
Polyp of the conjunctiva.....	1
Polyp of the larynx.....	1
Dermoid cyst of the ovary.....	1
Dermoid cyst of the eye.....	1
Adenoma of the prostate gland (hypertrophy).....	1
Papilloma of the bladder.....	1
Bone cyst of the jaw.....	1
Total.....	91

Specimens showing tuberculosis.

Tonsils.....	10
Adenoids.....	2
Cervical lymph nodes.....	4
Sinus of buttock.....	2

Specimens showing tuberculosis—Continued:

Intestinal ulcer.....	2
Appendix and mesoappendiceal nodes.....	1
Cord and testicle.....	1
Uterus and tube.....	1
Epididymis.....	1
Sinus of abdominal wall.....	1
Bone, left femur.....	1
Ear, external.....	1
Skin of elbow.....	1
Skin of hand.....	1
Mesenteric lymph node.....	1
Axillary lymph node.....	1
Total.....	31

Other infrequent lesions encountered.

Appendicitis with oxyuris vermicularis present.....	9
Ectopic pregnancy.....	5
Filarial hydrocele.....	3
Filarial lymphadenitis, inguinal and femoral.....	2
Amebic appendicitis.....	2
Ainhum.....	2
Gall bladder typhoid carriers.....	2
Otomycosis, external.....	2
Dermal leishmaniasis of the ear.....	1
Hodgkin's disease.....	1
Cystine calculus in kidney of negro.....	1
Dermal mycosis.....	1
Leprosy of a nasal septum.....	1
Gonococci, perforating ulcer of eye.....	1
Filaria medinensis of a toe (Guinea worm).....	1
Psoas abscess, actinomycosis.....	1
Elephantiasis nostras (result of long hypodermic use).....	1
Splenomegaly.....	1
Total.....	37

Miscellaneous human examinations.

Placental blood films (6 positive for malaria).....	249
Lepers examined for filariasis (1 positive).....	40
Skin and mucus membrane lesions examined.....	6
Tonsil crypt debris for <i>B. tuberculosis</i> (negative).....	3
Stool and urine.....	4
Differential leucocyte count.....	2
Total.....	304

Animals (wild and domestic), autopsies:

Guinea pigs.....	112
Dogs.....	21
Cattle.....	18
Mules.....	7
Horse.....	1
Cats.....	5
Hogs.....	6
Fowls, domestic.....	15
Rabbits.....	7
White rats.....	14
White mice.....	5
Rats (wild).....	2
Goat.....	1
Monkey.....	1
Deer.....	1
Sloth.....	1
Ocelot (<i>Tigre chico</i>).....	1
Porcupine.....	1
Wild animals and birds of Chagres River basin.....	65
Total.....	294

Animals (wild and domestic), examination.

Tissue from horses.....	5
Tissue from cattle.....	2
Tissue from hogs.....	2
Tissue from wild animals.....	14
Stomach and contents from a cat.....	1
Blood films from horse.....	26
Blood films from cattle.....	15
Blood films from dogs.....	10
Stools from dog.....	12
Blood films from white rats.....	2
Holstein bulls immunized (Piroplasmosis).....	2
Total.....	91

The principal diseases encountered that were important among domestic animals were as follows:

Horses.—Chronic glanders; piroplasmosis.

Cattle.—Piroplasmosis; blackleg; anthrax; tuberculosis.

Hogs.—Cholera; blackleg; gas gangrene.

Calves.—Umbilical infections.

Fowls.—Diphtheria.

Guinea pigs and rabbits.—Paratyphoid fever.

Rats examined.....	18,476
<i>Mus musculus</i>	9,588
<i>Mus norvegicus</i>	2,365
<i>Mus alexandrinus</i>	1,436
<i>Mus rattus</i>	4,305
<i>Sigmodon hispidus chiriquensis</i>	776
<i>Proechimys semispinosus panamensis</i>	5

Microscopic slides prepared.

Surgical preparations.....	3,893
Autopsy preparations, human.....	2,249
Animal tissue preparations.....	1,116
Total.....	7,258

(183 of the preparations by frozen method.)

Special reports.

Blood parasites of the native monkeys.

Renal anomalies in 4,215 consecutive autopsy records.

CHEMICAL DEPARTMENT.

Analyses, examinations, etc.

Arsenical cattle dips.....	9
Alcohol.....	1
Bleaching powder.....	1
Blood specimens examined.....	437
Nonprotein nitrogen determinations.....	393
Urea nitrogen determinations.....	381
Uric acid determinations.....	383
Creatinin determinations.....	388
Glucose determinations.....	386
Phosphorus determinations.....	25
Cholesterol determinations.....	5
Calcium determination.....	1
Ammonia determination.....	1
Beverages.....	11
Alcohol determination only.....	6
Complete analysis.....	5
Bullets.....	4
Calculi (urinary).....	3
Calibration of clinical thermometers.....	700
Calibration of chemical thermometers.....	13
Calibration of urinometers.....	14
Cotton-seed meal.....	1
Crude carbolic acid.....	3

CHEMICAL DEPARTMENT—continued.

Analyses, examinations, etc.—Continued:

Dextrose.....	1
Evaporation of ink.....	1
Foodstuffs examined.....	73
Bread.....	3
Butter.....	5
Crisco.....	1
Flour.....	1
Grape Nuts.....	1
Harina de Platano.....	1
Ice cream.....	5
Kippered herring.....	1
Lemon drops.....	1
Milks, dairy.....	12
Milks, sweetened condensed.....	11
Milks, unsweetened evaporated.....	9
Milks, mother's.....	15
Mellin's Food.....	1
Nestle's Food.....	1
Sausages.....	1
Vinegar.....	4
Gastric analyses.....	45
Hide, for arsenic and mercury.....	1
Liquid from can closet.....	1
Nasal secretion.....	1
Paper clip.....	1
Petroleum (fuel oil).....	3
Paint scrapings.....	1
Quinine salts.....	4
Spinal fluids examined.....	608
Colloidal gold.....	593
Butyric acid.....	59
Ammonium sulphate.....	583
Phenol.....	586
Arsenic.....	6
Sugar (sucrose content).....	1
Stools for blood.....	3
Serum, salvarsinized, for arsenic.....	1
Soap.....	1
Specimens for identification.....	29
Sodium bicarbonate (baking soda).....	1
Opium.....	6
Cocaine hydrochloride.....	9
Morphine hydrochloride.....	6
Mercurous chloride (calomel).....	1
Boric acid.....	1
Toxicological examinations.....	7
Human autopsy No. 6155, methyl alcohol detected.....	1
Animal autopsy No. 2065, dog, arsenic detected.....	1
Test tubes.....	1
Urine examinations.....	112
Routine analyses.....	53
Glucose.....	41
Creatinin.....	2
Uric acid.....	3
Ammonia nitrogen.....	2
Total nitrogen.....	1
Urea nitrogen.....	4
Lead.....	2
Renal function.....	2
Nitrogen partition.....	3
Albumin.....	3
Bence-Jones protein.....	1
Acetone bodies.....	8
Chyle.....	1
Indican.....	1
Water, chlorine content.....	1
Water, distilled.....	1
Solvents recovered from waste:	
Alcohol, gallons.....	10
Acetone, gallons.....	6
Ethyl esters of mixed fatty acids of chaulmoogra oil prepared, c. c.....	5,500

ENTOMOLOGICAL REPORT.

IDENTIFICATION OF MOSQUITOES.

	Adults.	Lots of larvæ.
Culicini:		
Anopheles albimanus.....	11,250	8
Anopheles tarsimaculata.....	1,706	
Anopheles punctimacula.....	110	
Anopheles pseudopunctipennis.....	49	
Anopheles argyritarsis.....	8	9
Anopheles eiseni.....	2	
Anopheles apicimacula.....	9	
Anopheles spp. (too badly damaged for identification).....	7	
Total number of anopheles.....	13,141	17
Mansonia titillans.....	946	
Mansonia nigricans.....	37	
Mansonia fasciolatus.....	84	
Aedes calopus.....	178	194
Aedes taeniorhynchus.....	476	7
Aedes trivittatus.....	58	
Aedes serratus.....	35	
Aedes fulvius.....	3	
Aedes thorntoni.....		1
Culex quinquefasciatus.....	99	36
Culex proximus.....		14
Culex coronator.....		12
Culex corniger.....		15
Culex imitator.....		1
Culex reflector.....		1
Culex factor.....		7
Culex jubulator.....		3
Culex elevator.....		1
Culex leprincei.....		1
Culex spp.....	3,378	12
Uranotænia geometrica.....	1	1
Aedeomyia squamipennis.....	3	
Hemogogus splendens.....	2	1
Psorophora posticatus.....	15	
Total culicini less anopheles.....	5,315	307
Sabethini:		
Wyeomyia, limatus, etc.....	167	6
Total number of mosquitoes identified.....	18,623	330

There were 594 pill boxes of adult mosquitoes received for identification from January 1, 1921, to August 31, 1921, inclusive:

Identification of other insects.

Cayenne ticks, *Amblyomma cajennense*, taken from man.

Fly larvæ, *Dermatobia cyaniventris* Macq., from scalp of man.

Fly larvæ, *Dermatobia cyaniventris*, that had been removed from eyelid of man.

Larvæ of bottle fly, *Dermatobia cyaniventris*, from case of myiasis in man.

Human fleas, *Pulex irritans*, from Mura Camp.

Pubic lice, *Pediculus pubis*.

Screw-worm flies, *Cochliomyia macellaria*, from case of myiasis.
 Larvæ of screw-worm fly, *Cochliomyia macellaria* and *Cephenomyia* sp., causing myiasis in deer.
 Ticks, *Amblyomma cajennense* and *Amblyomma darlingi*, from deer.
 South American cattle tick, *Margaropus annulatus australis*, from cow.
 Cayenne tick, *Amblyomma cajennense*, taken from cow.
 Short-nosed ox louse, *Hæmatopinus eurytæstus*, from cattle.
 Brown dog ticks, *Rhipicephalus sanguineus*, from dog.
 Cat fleas, *Ctenocephalus felis*, from dog.
 House flies, *Musca domestica*.
 Fruit flies, *Drosophila* sp.
 Hump-backed flies, *Phora* sp.
 Moth flies, *Psychoda albipuncta*, from Panama.
 Stable flies, *Muscina stabulans*.
 Flesh flies, *Sarcophagula occidus*.
 Horse flies, *Pangonia* sp.
 Syrphid flies, *Volucella obesa*.
 "Soldier flies," *Hermetia illucens*, from Panama.
 Small scavenger flies, *Aphiochæta picta*, from Panama.
 Plant lice, *Aphids*.
 Flea beetles, *Halticini*, from Corozal Hospital farm.
 Female leaf cutting ant, *Atta* sp.
 Fowl ticks, *Argas miniatus*.

UNDERTAKING DEPARTMENT.

Number of bodies received (4 disinterred).....	414
Number of bodies embalmed.....	56
Number of bodies cremated.....	134
Number of bodies buried on Isthmus.....	224
Number of bodies shipped from Isthmus.....	50

ADMISSION RATE PER 1,000 EMPLOYEES.

HOSPITALS AND QUARTERS.

ALL CAUSES.

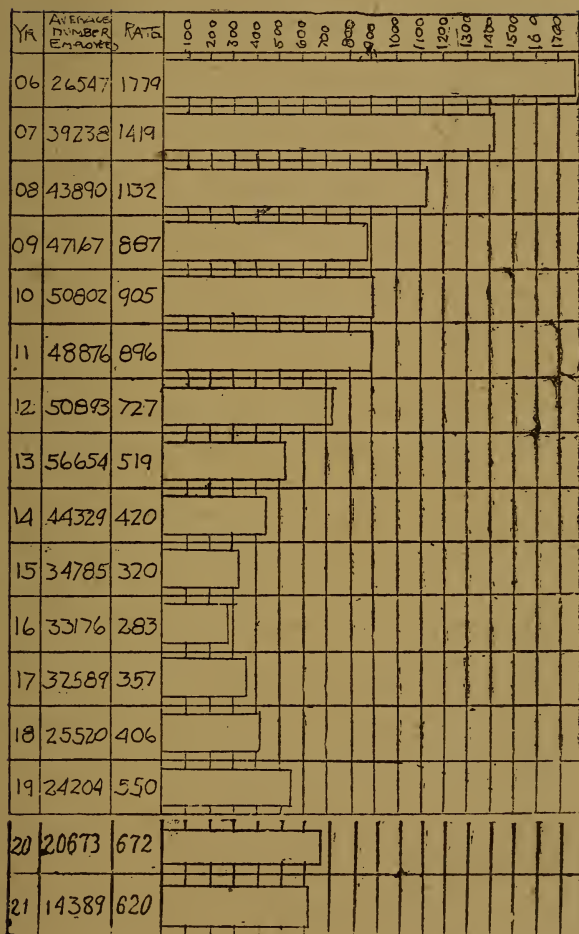


CHART NO. 1.

DEATH RATE PER 1,000 EMPLOYEES.

ALL CAUSES.

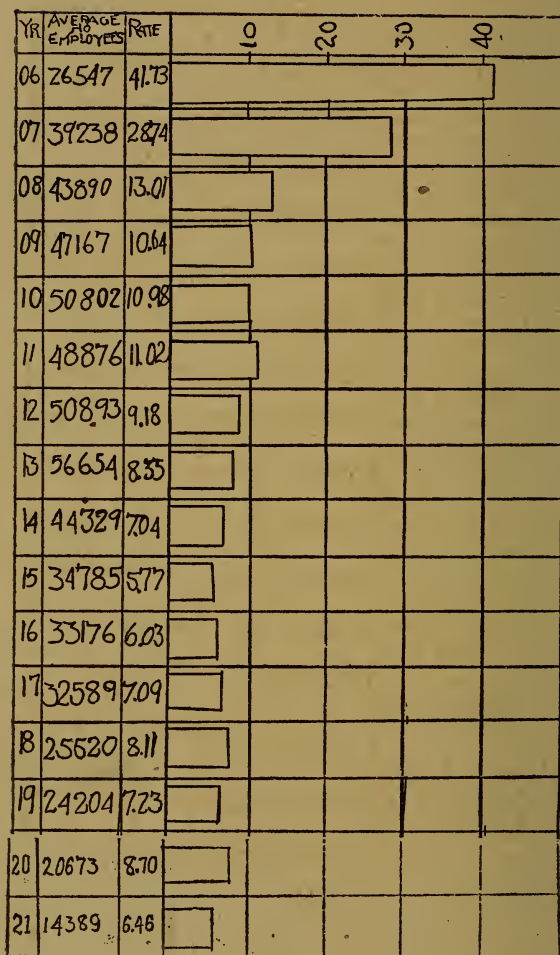


CHART NO. 2.

NONEFFECTIVE RATE PER 1,000 EMPLOYEES.

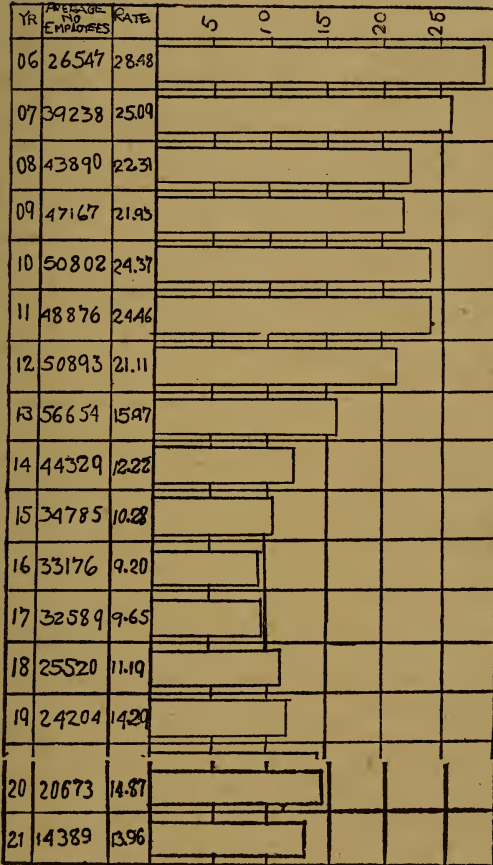


CHART No. 3.

MALARIAL FEVER

ADMISSION RATE PER 1,000 EMPLOYEES.

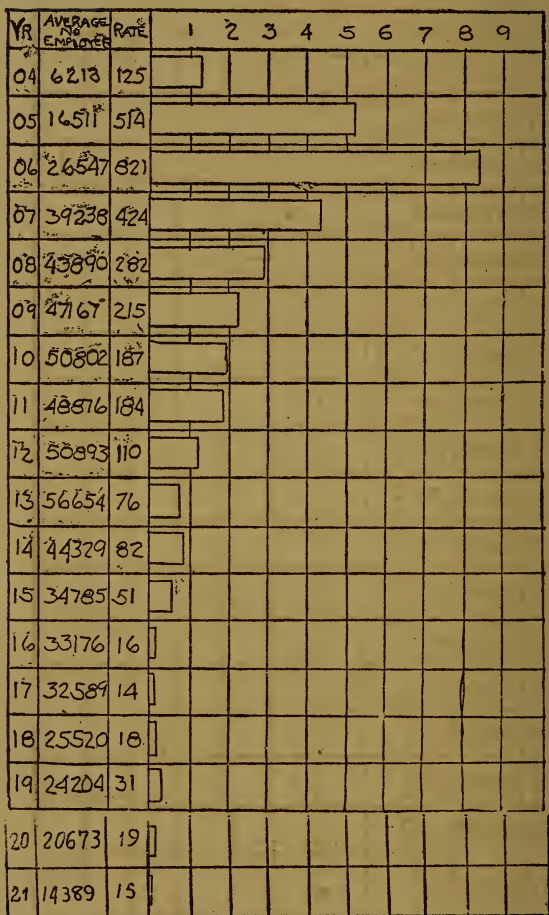


CHART NO. 4.

MALARIAL FEVER.

DEATH RATE PER 1,000 EMPLOYEES.

YR	AVERAGE NUMBER EMPLOYEES	DEATH RATE	-	2	3	4	5	6	7
04	6213	2.66							
05	16511	5.57							
06	26547	7.45							
07	39238	3.57							
08	43890	1.37							
09	47167	.85							
10	50802	.81							
11	48876	.84							
12	50893	.31							
13	56654	.30							
14	44329	.14							
15	34785	.23							
16	33176	.06							
17	32589	.09							
18	25520	.08							
19	24204	.08							
20	20673	.15							
21	14389	.0							

CHART No. 5.

MALARIAL FEVER.

DEATH RATE PER 1,000 POPULATION IN THE CANAL ZONE
AND THE CITIES OF PANAMA AND COLON.

EMPLOYEES AND NONEMPLOYEES.

Yr.	POPULATION	RATE	1	2	3	4	5	6	7	8	9
06	73264	9.49									
07	102133	5.37									
08	120097	3.36									
09	135180	2.07									
10	151591	1.89									
11	156936	1.82									
12	146510	1.64									
13	129104	1.32									
14	123592	1.27									
15	121650	.51									
16	116918	.21									
17	114003	.18									
18	109737	.18									
19	113958	.16									
20	114037	.08									
21	120666	.16									

CHART No. 6.

TABLE I.—DISCHARGES FROM HOSPITALS, DEATHS, AND NONEFFECTIVE RATES FOR EMPLOYEES.

ABSOLUTE NUMBERS.

	Average number of employees.	Discharges from hospitals.			Deaths.			Noneffective from sickness.	
		Total.	Disease.	External causes.	Total.	Disease.	External causes.	Days treated.	Constantly noneffective.
Year, 1921:									
White.....	3,855	1,040	950	90	13	10	3	21,957	60.16
Colored.....	10,534	1,999	1,645	354	80	72	8	51,343	140.67
Totals.....	14,389	3,039	2,595	444	93	82	11	73,300	200.83
Year, 1920:									
White.....	4,688	1,393	1,252	141	22	17	5	31,775	86.81
Colored.....	15,985	3,183	2,550	633	158	136	22	80,760	220.65
Totals.....	20,673	4,576	3,802	774	180	153	27	112,535	307.46

PROPORTIONATE NUMBERS.¹⁰

Year, 1921:									
White.....	3,855	269.78	246.43	23.35	3.37	2.59	0.78	.....	15.61
Colored.....	10,534	189.77	156.16	33.61	7.59	6.83	.76	.....	13.35
Totals.....	14,389	211.20	180.35	30.85	6.46	5.70	.76	.....	13.96
Year, 1920:									
White.....	4,688	297.14	267.06	30.08	4.69	3.63	1.06	.....	18.52
Colored.....	15,985	199.12	159.53	39.59	9.88	8.51	1.37	.....	13.80
Totals.....	20,673	221.35	183.91	37.44	8.70	7.40	1.30	.....	14.87

¹⁰ Annual average per 1,000 employees.

TABLE II.—CAUSES OF DEATHS OF EMPLOYEES BY COLOR,

Cause of death.	Color.		Age (in years).					
	W.	B.	15-20	21-25	26-30	31-35	36-40	41-45
Typhoid fever.....	1							1
Paratyphoid fever.....		1				1		
Tetanus.....	1	1				1		
Pellagra.....		1						
Tuberculosis of the lungs.....	9				4		4	
Pott's disease.....	1	1				1		
Tuberculosis of other organs.....	1				1	1		
Syphilis, tertiary.....	3		1				1	
Cancer, stomach, etc.....		2						1
Cancer, intestines, etc.....	1							1
Cancer, organs not specified.....		1						
Anemia, chlorosis.....		1					1	
Pneumococcus meningitis.....		1				1		
Apoplexy.....	1	5			1		2	1
Softening of the brain.....	1	1						
General paralysis of insane.....		2			1			
Tumor of the brain.....	1						1	
Acute endocarditis.....	1	2						
Organic diseases of heart.....	1	13		1	1	3	2	1
Angina pectoris.....	1	1					1	
Aneurysm.....		3			1	1	1	
Arteriosclerosis.....	1							
Lobar pneumonia.....		7		1	1	2	1	2
Empyema.....	1							
Abscess of lungs.....		1				1		
Acute appendicitis.....		2					1	1
Duodenal ulcer.....	1							
Cirrhosis of the liver.....		1				1		
Abscess of the liver.....	1	1				1		
Diseases of the spleen.....		1	1					
Acute nephritis.....		1					1	
Chronic nephritis.....	1	7			2		1	3
Pyelo-nephrosis.....		1						
Stricture of the urethra, nonvenereal.....		1						1
Suicide by drowning.....	1	1				1	1	
Suicide by firearms.....		1		1				
Accidental drowning.....	1	1				2		
Traumatism by fall.....		1					1	
Traumatism by machines.....	1					1		
Traumatism by crushing.....		4			1			1
Totals.....	13	80	1	4	13	18	19	13

AGE, AND LENGTH OF RESIDENCE ON ISTHMUS.

Age (in years)— Continued.					Length of residence on Isthmus (in years).													Total.
46-50	51-55	56-65	66-75	Unknown	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-10	10-15	Over 15.	Life.	Unknown.	Total.	
												1				1	1	
1													1			1	1	
													4	1		3	9	
												1	1				1	
1		1										1					1	
																	1	
1												1	1			1	3	
																	2	
1												1				1	1	
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																	1	

TABLE III.—DEATHS OF RESIDENTS AND DEATH RATES, OF THE CITIES OF PANAMA AND COLON, AND THE CANAL ZONE.

Place.	Average population.	Deaths.			Annual rate per 1,000 population.		
		Total.	Disease.	External causes.	Total.	Disease.	External causes.
Year, 1921:							
Panama.....	60,500	1,336	1,286	50	22.09	21.26	0.83
Colon.....	28,789	497	468	29	17.26	16.25	1.01
Canal Zone.....	31,377	236	211	25	7.52	6.72	.80
Totals.....	120,666	2,069	* 1,965	104	17.15	16.29	.86
Year, 1920:							
Panama.....	60,500	1,297	1,246	51	21.44	20.60	.84
Colon.....	26,078	554	517	37	21.24	19.82	1.42
Canal Zone.....	27,459	242	211	31	8.81	7.68	1.13
Totals.....	114,037	2,093	1,974	119	18.35	17.31	1.04

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>General diseases.</i>									
Typhoid fever.....	2	3	1	4					2
Paratyphoid fever.....	1			1					
Malaria.....	1			1					
Malarial fever, estivoautumnal.....	7	1	3	4	1		2		2
Malarial fever, tertian.....	3		2	1					1
Malarial fever, mixed.....		1		1				1	
Malarial fever, clinical.....		2	1	1					
Malarial fever, cachexia.....	2			2					
Hemoglobinuric fever, malarial.....	1	1		2				1	
Smallpox.....		2		2		2			
Measles.....		3		3		1	1		
Scarlet fever.....	2		1	1			1	1	
Whooping cough.....	1	1	1	1			2		
Diphtheria and croup.....	3	3	1	5		1	5		
Influenza.....	7	13	1	18	1	2	8		1
Dysentery.....	2			2					
Dysentery, entamebic.....	3	1	1	3					
Dysentery, bacillary.....	6	5	1	10		6	3		2
Purulent infection and septicemia.....	7	2	2	7		1	1		3
Septicemia.....	3	3	1	5			2		1
Pyemia and septicemia, pneumo- cocci.....	3		1	2				1	
Tetanus.....	3	2	1	4		1			
Pellagra.....	4	10		14					1
Beriberi.....	1	1		2		2			
Tuberculosis of the lungs.....	137	112	25	209	15		3	2	17
Acute miliary tuberculosis.....	4	7	2	9		2	3	2	
Tuberculosis meningitis.....	6	7	5	7	1	6	3	3	1
Abdominal tuberculosis.....	1			1					
Pott's disease.....	1	2		3					1
White swellings: Tuberculosis of bones and joints.....		1	1					1	
Tuberculosis of other organs.....	1			1					
Tuberculosis of the larynx.....	1	1		2					
Tuberculosis of the lymph glands.....	2		1	1			1		
Tuberculosis of the genito-urinary organs.....	1	1	1	1					
Disseminated tuberculosis.....	12	11	2	21		1	7		3
Rickets.....	3	1		4		4			
Syphilis, tertiary.....	28	10	1	37			1		
Syphilis, hereditary.....	11	5		16		12	2	2	
Syphilis, period not stated.....	1			1					
Cancer and other malignant tumors of the buccal cavity.....	3	3	4	2					
Cancer and other malignant tumors of the stomach and liver.....	7	3	1	7	2				
Cancer and other malignant tumors of the peritoneum, intestines, rec- tum.....	4	3	2	5					
Cancer and other malignant tumors of the female genital organs.....		12	3	9					
Cancer and other malignant tumors of the breast.....		3		3					
Cancer and other malignant tumors of the skin.....	2	1	1	2					

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
1	1	1					2	1	2	5
	1						1			1
	1						1			1
2		2					5	2	1	8
1			1					2	1	3
									1	1
1	1						1		1	2
		1	1				2			2
	1						2			2
1							1		1	2
							1	1		2
							1	1		2
							4	2		6
1	2	1	1		3	1	13	2	5	20
	1	1					2			2
1	1	1	1				1	2	1	4
							7	2	2	11
	2	1	1				5	3	1	9
3							2	2	2	6
1	1						2	1		3
	3		1				3	1	1	5
2	5	2	3		1		7	7		14
							1		1	2
87	80	41	13	5	1		181	56	12	249
2	1	1					7	1	3	11
				1			10	2	1	13
	2						1			1
							2	1		3
							1			1
1							2	1		2
2							1		1	2
1							1			2
	1			1			2			2
6	2	2	1	1			15	5	3	23
								4		4
3	17	9	4	4			23	11	4	38
							7	4	5	16
	1						1			1
		2	3	1			5		1	6
		4	2	4			7	2	1	10
	1	3	2	1			5	1	1	7
1	1	6	2	2			9	3		12
1	1	1					2		1	3
		1	1	1			2		1	3

TABLE IV. —DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>General diseases.—Continued.</i>									
Cancer and other malignant tumors of other organs and of organs not specified.....	9	7	2	13	1				1
Other tumors (tumors of the female genital organs excepted).....		1		1					
Acute articular rheumatism.....		1	1			1			
Diabetes.....	1	9	2	8					
Leukemia: Lymphatic.....	1			1			1		
Hodgkin's disease.....	1			1					
Anemia, chlorosis.....	1			1					
Anemia, primary, pernicious.....		2	2						
Other general diseases.....		1		1		1			
Alcoholism (acute or chronic).....	1			1					
Alcoholism, acute.....	1		1						
Alcoholism, chronic.....	2		2						
Other chronic poisonings: Drug habit.....		1	1						
<i>Diseases of the nervous system and of the organs of special sense.</i>									
Encephalitis.....	1	2	1	2		1		1	1
Simple meningitis.....	7	3	4	6		5	2	1	1
Pneumococcus meningitis.....	4	2	1	5					1
Locomotor ataxia.....	2			2					
Other diseases of the spinal cord.....		1		1					
Acute anterior polio-myelitis.....	1			1					
Cerebral hemorrhage, apoplexy.....	28	16	11	31	2				
Softening of the brain.....	2	1	1	2					
General paralysis of the insane.....	6	3	1	8					
Other forms of mental alienation.....		1		1					
Epilepsy.....	4	2	2	4				2	2
Convulsions of infants (under 5 years of age).....		3		2	1	3			
Other diseases of the nervous system:									
Tumor of the brain.....	1		1						
Diseases of the ears.....	1			1			1		
Otitis media.....	7	4	2	9		4	7		
<i>Diseases of the circulatory system.</i>									
Pericarditis.....	2	3		5				1	1
Acute endocarditis.....	10	12	1	21		4	6	2	1
Malignant endocarditis.....	2			2					
Organic diseases of the heart.....	50	47	14	82	1	1	2	5	1
Angina pectoris.....	1	2		3					
Diseases of the arteries, atheroma, Aneurysm, etc.....	2			1	1				
Aneurysm.....	5	2		7					
Arteriosclerosis.....	5	10	3	11	1				
Embolism and thrombosis.....	3	1		3	1				
Diseases of the lymphatic system (lymphangitis, etc.).....	3			3		2	1		
<i>Diseases of the respiratory system.</i>									
Diseases of the larynx.....	2	1		3		2	1		
Diseases of the thyroid body.....		1		1					
Acute bronchitis.....	23	24	6	41		29	16	1	
Chronic bronchitis.....	2	3		5		2	2		

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
	2	4	5	4			9	5	2	16
				1			1			1
				1			1			1
1	1	4	2	1	1		5	1	4	10
									1	1
		1					1			1
	1								1	1
1	1						2			2
									1	1
1								1		1
	1								1	1
	1								1	1
		1					1	1		2
		1							1	1
1							2	1		3
	3	1	1				8	2		10
		1	1				4	1	1	6
							2			2
1								1		1
					1			1		1
4	5	7	20	5	2	1	26	12	6	44
			1	1		1	1	1	1	3
1		4	1	2	1		2	3	4	9
		1						1		1
1		1					4	1	1	6
							2	1		3
	1								1	1
								1		1
							6	3	2	11
	2			1			3	1	1	5
1	1	2	5				14	5	3	22
		1	1				1	1		2
14	23	11	20	18	2		57	29	11	97
		1	1	1			2		1	3
	1			1			1	1		2
3	2	2					3	2	2	7
	1	1	2	6	5		11	3	1	15
2	1	1					2	1	1	4
							3			3
							3			3
	1							1		1
					1		25	20	2	47
					1		1	4		5

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>Diseases of the respiratory system.—Continued.</i>									
Broncho-pneumonia.....	96	85	25	153	3	78	60	7	4
Pneumonia (unqualified).....	15	6	3	18		2	6	2	3
Lobar pneumonia.....	44	29	5	67	1	2	9	1	5
Pleurisy.....	1	3		4			1	1	1
Empyema.....	2	5	1	6			2		1
Pulmonary congestion, pulmonary apoplexy.....	1			1					
Gangrene of the lungs.....	4	2	1	5				1	
Other diseases of the respiratory system (tuberculosis excepted).....	1				1				
Abscess of the lungs.....	3			3					
<i>Diseases of the digestive system.</i>									
Diseases of the mouth and annexe.....		1		1		1			
Diseases of the pharynx.....	2			2			1		
Pharyngitis.....		1		1					
Diseases of the esophagus.....	1			1			1		
Ulcer of the stomach.....	5	2	2	4	1		1		
Other diseases of the stomach (cancer excepted):									
Acute gastritis.....	6	8	4	10		7		2	
Acute indigestion.....	2	3		5		2	3		
Diarrhea and enteritis (under 2 years).....	115	95	25	185		158	52		
Colitis.....	3	4		7		4	3		
Diarrhea and enteritis (2 years and over).....	9	4	2	11			8	2	
Colitis.....	3	2	1	4			2		
Ankylostomiasis.....	1	1		2				1	
Appendicitis and typhlitis.....		1		1					
Acute appendicitis.....	4		1	3					1
Hernia, intestinal obstructions.....	3	1	1	3		1			
Intestinal obstruction.....	8	4		12		5		1	
Other diseases of the intestines.....	1	1		2					
Duodenal ulcer.....	1	1	1	1		1			
Cirrhosis of the liver.....	10	5	6	9					
Other diseases of the liver.....		1		1					
Abscess of liver (unqualified).....	2	1		3					
Abscess of the liver, entamebic.....	1			1					
Cholecystitis.....	3			3			1		
Diseases of the spleen.....	1			1					1
Abscess of spleen.....	1			1					
Simple peritonitis (nonpuerperal).....	3	10	2	10	1				1
Other diseases of the digestive system (cancer and tuberculosis excepted).....	2	1	1	1	1				
<i>Nonvenereal diseases of the genito-urinary system and annexe.</i>									
Acute nephritis.....	25	22	4	43		19	6	5	3
Bright's disease (chronic nephritis).....	72	39	20	88	3	1	3	1	1
Other diseases of the kidney and annexe.....		1		1		1			
Pyelo-nephrosis.....	3	1	1	3		3			

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
7	10	8		5	2		147	28	6	181
3	1	1	1	2			21			21
16	21	9	7	3			55	11	7	73
		1					3		1	4
	1	2	1				5	2		7
				1			1			1
2	2		1				5	1		6
				1			1			1
	2	1					3			3
									1	1
1							2			2
		1					1			1
									1	1
1	2	1	1	1			3	2	2	7
	2	1	1	1			13	1		14
							174	33	3	210
							6		1	7
	1	1	1				7	6		13
1		1	1				5			5
		1					1	1		2
1							1			1
1	1	1					1		3	4
			2		1		4			4
3	1		2				4	7	1	12
1		1					2			2
									2	2
1	2	5	3	4			8	4	3	15
	1						1			1
	2	1					2	1		3
	1								1	1
1	1						1	2		3
									1	1
1							1			1
3	3	5		1			8	3	2	13
1		1	1				1		2	3
3	4	4	2	1			38	5	4	47
10	22	26	19	19	9		71	34	6	111
				1			1			1
							2	2		4

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years).			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>Nonvenereal diseases of the genito-urinary system and annea.—Continued.</i>									
Diseases of the bladder: Cystitis.....		1		1					
Diseases of the urethra, urinary abscess, etc.....	1			1					
Stricture of the urethra, non-venereal.....	1			1					
Diseases of the prostate: Hypertrophy of prostate.....	1			1					
Uterine tumor (noncancerous).....		2		2					
Cysts and other tumors of the ovary.....		1		1					
Salpingitis and other diseases of the female genital organs.....		5		5					2
<i>The puerperal state.</i>									
Accidents of pregnancy.....		2		2					
Extra-uterine pregnancy.....		2		2					
Hyperemesis gravidarum.....		1		1					
Abortion.....		1	1						
Puerperal hemorrhage.....		2		2					
Other accidents of labor.....		5		5					1
Puerperal septicemia.....		5	1	4					1
Puerperal albuminuria and convulsions.....		3		3					
Eclampsia.....		14	3	11					2
<i>Diseases of the skin and of the cellular tissue.</i>									
Gangrene.....	2	1	2	1					
Acute abscess: Phlegmom and cellulitis.....	3			3		1			
<i>Diseases of the bones and of the organs of locomotion.</i>									
Diseases of the bones (tuberculosis excepted).....	2			2					
Mastoid abscess.....	2			2			2		
Diseases of the joints (tuberculosis and rheumatism excepted): Arthritis.....		1		1					
<i>Malformations.</i>									
Congenital malformations (stillbirth not included).....	3	6	1	8		8			1
<i>Diseases of early infancy.</i>									
Congenital debility, icterus, and sclerema.....	16	9	2	22	1	24	1		
Premature birth.....	31	24	10	45		55			
Congenital debility.....	3	1		4		3	1		
Malnutrition.....	26	27	3	50		43	10		
Other causes peculiar to early infancy including various consequences of labor).....	33	14	7	38	2	47			

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un-known.	Pan-ama.	Colon.	Canal Zone.	Total.
				1				1		1
	1							1		1
		1						1		1
		1					1			1
	1	1						1	1	2
1								1		1
	3						3	2		5
2							1	1		2
	2						1	1		2
1								1		1
	1						1			1
1	1						2			2
3	1						2	3		5
3	1						1	4		5
2	1							2	1	3
7	5						5	6	3	14
		2			1		2	1		3
	1			1			2		1	2
	1				1		2			2
							2			2
	1								1	1
							5	2	2	9
							10	11	4	25
							27	16	12	55
								4		4
							14	21	18	53
							32	6	9	47

TABLE IV.—DEATHS OF RESIDENTS OF THE CANAL ZONE AND THE PLACE OF

Cause of death.	Sex.		Color.			Age (in years)			
	M.	F.	W.	B.	Y.	Under 1 yr.	1-4	5-10	11-20
<i>Old age.</i>									
Senility.....	6	5	2	8	1				
<i>Affections produced by external causes.</i>									
Suicide by poisoning.....	2		1	1					
Suicide by hanging or strangulation..	5		2	3					1
Suicide by drowning.....	6		1	5					
Suicide by firearms.....	8	2	2	8					2
Acute poisonings.....	1	2	2	1					
Conflagration.....	1			1					
Burns (conflagration excepted).....	3	2	1	4		1	2		
Absorption of deleterious gases (conflagration excepted).....		1		1		1			
Accidental drowning.....	15	1	5	11			1	3	2
Traumatism by firearms.....	3	1	2	1	1				
Traumatism by fall.....	9	1		10			4	1	
Traumatism by machines.....	1		1						
Traumatism by other crushings (vehicles, railroads, landslides, etc.).....	14	3	6	11			2	1	1
Traumatism by landslides.....	2			2					
Homicide by firearms.....	7	2	3	6					
Homicide by cutting or piercing instruments.....	1	2		3					1
Homicide by other means.....	3	1		3	1	2			
Other external violence.....	2			1	1				1
<i>Ill-defined diseases.</i>									
Cause of death not specified or ill-defined.....	17	11	3	24	1	15	11		
Infections of undetermined origin.....	1	2	1	2		1			1
Totals.....	1,163	906	294	1,728	47	581	277	56	81

CITIES OF PANAMA AND COLON, BY CAUSE, SEX, COLOR, AGE, AND RESIDENCE.—Continued.

Age (in years)—Continued.							Place of residence.			
21-30	31-40	41-50	51-60	61-75	76-100	Age un- known.	Pan- ama.	Colon.	Canal Zone.	Total.
			1	3	7		10	1		11
2							1	1		2
2	1		1				4	1		5
1	5						2	3	1	6
4	2			1	1		6	3	1	10
1	1	1					1		2	3
1							1			1
1		1					2	2	1	5
									1	1
5	2	2		1			8	1	7	16
4							1	1	2	4
1	3		1				6	2	2	10
	1							1		1
6	3	1		3			5	7	5	17
2							2			2
6	2	1					3	5	1	9
2							2	1		3
1	1						4			4
		1					1	1		2
	1	1					11	7	10	28
1							2	1		3
266	299	210	143	112	41	3	1,336	497	236	2,069

TABLE IV-A.—DEATHS

Cause of death.	Sex.		Color.		Less than 1 year.
	M.	F.	W.	B.	
Typhoid fever.....	1			1	
Malaria.....	1			1	
Malarial fever, estivoautumnal.....	1		1		
Malarial fever, cachexia.....	1			1	
Hemoglobinuric fever, malarial.....	1		1		
Malarial fever, undetermined.....		1	1		
Measles.....	1		1		
Scarlet fever.....	1			1	
Influenza.....	2		1	1	
Dysentery.....	1			1	
Dysentery, entamebic.....	5	1	1	5	
Purulent infection and septicemia.....		1	1		
Pyemia.....	2		2		
Tuberculosis of the lungs.....	24	7	6	25	
Acute miliary tuberculosis.....	2			2	
Tuberculosis meningitis.....	1		1		
Abdominal tuberculosis.....	1		1		
Disseminated tuberculosis.....	1			1	
Syphilis, tertiary.....	3			3	
Cancer and other malignant tumors of the stomach and liver.....	3	2	4	1	
Cancer and other malignant tumors of the female genital organs.....		1		1	
Cancer and other malignant tumors of the heart.....		2	2		
Cancer and other malignant tumors of the skin.....		2	1	1	
Cancer and other malignant tumors of other organs and of organs not specified.....	2		1	1	
Anemia, primary, pernicious.....	1			1	
Cerebrospinal fever.....		1		1	
Cerebral hemorrhage, apoplexy.....	1	1	2		
Softening of the brain.....	1	1	1	1	
Paralysis without specified cause.....	1			1	
General paralysis of the insane.....	1		1		
Diseases of the ear.....	1			1	
Pericarditis.....	2			2	
Acute endocarditis.....		1	1		
Malignant endocarditis.....	1			1	
Organic diseases of the heart.....	9	3	5	7	
Aneurysm.....	2		1	1	
Hemorrhage; other diseases of the circulatory system.....	1			1	
Acute bronchitis.....	1			1	1
Broncho-pneumonia.....	4	3	1	6	
Pneumonia (unqualified).....	1			1	
Lobar pneumonia.....	12	3	5	10	
Empyema.....	1		1		
Gangrene of the lungs.....	2		1	1	
Diseases of the pharynx.....		1	1		
Chronic gastritis.....		1	1		
Diarrhea and enteritis.....	1	1		2	1
Colitis.....	1	1	2		
Ankylostomiasis.....	1			1	
Acute appendicitis.....	1		1		
Chronic appendicitis.....		1		1	
Cirrhosis of the liver.....	5		2	3	
Cholecystitis.....	1		1		
Simple peritonitis.....	1	3	3	1	
Acute nephritis.....	1		1		
Chronic nephritis.....	14	2	5	11	
Pyelo-nephrosis.....		1	1		
Puerperal hemorrhage.....		1		1	

OF NONRESIDENTS.

Age (in years).										Total.
1-4	5-10	11-20	21-30	31-40	41-50	51-60	61-75	Over 75	Un- known.	
1				1						1
					1					1
			1							1
				1						1
1										1
		1								1
			1							1
1					1					2
		1								1
		1	1	2			1		1	6
				1						1
		1	1							2
		7	6	9	3	3	1	2		31
			1	1						2
		1								1
			1							1
1										1
				2	1					3
				1	1	2	1			5
				1						1
			2							2
	1			1						2
					1	1				2
						1				1
			1							1
1			1							2
				1		1				2
								1		1
			1							1
		1			1	1				2
										1
		1			1					1
			1	1	1	1	1			12
					1	1				2
							1			1
										1
2			1	1	1	2				7
				1						1
	1	3	6	1	1	2	1			15
				1						1
				1		1				2
1										1
						1				1
1										2
1					1					2
				1						1
									1	1
				1	2	1	1			5
				1		1				1
		1	2	1						4
						1				1
			2	7	5	2				16
	1									1
			1							1

TABLE IV-A.—DEATHS

Cause of death.	Sex.		Color.		Less than 1 year.
	M.	F.	W.	B.	
Gangrene.....	1	1		2	
Phlegmon and cellulitis.....	1			1	
Mastoid abscess.....	1			1	
Osteomyelitis.....	1			1	
Suicide by jumping from high place.....	1		1		
Accidental drowning.....	9	1	2	8	1
Traumatism by fall.....	2			2	
Traumatism by crushing.....	1		1		
Railroad traumatism.....	2			2	
Injuries by animals.....	1			1	
Homicide by firearms.....	3			3	
Other external violence.....	3			3	
Totals.....	148	44	66	126	3

OF NONRESIDENTS—Continued.

Age (in years).										Total.
1-4	5-10	11-20	21-30	31-40	41-50	51-60	61-75	Over 75	Un- known.	
1			1		1					2
			1							1
			1							1
			1							1
					1					1
		1	4	2	1	1				10
			1			1				2
			1							1
		1					1			2
			1							1
			1	2						3
			1						2	3
11	3	20	42	42	32	24	8	3	4	192

TABLE V.—DEATHS BY NATIONALITY OR NATIVITY, YEAR 1921.

Country.	Employees.		Nonemployees.		Total.		Grand total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Antigua.....	4		10	3	14	3	17
Antilles.....			1	2	1	2	3
Austria.....			1		1		1
Barbados.....	21		122	123	143	123	266
British Guiana.....			2	2	2	2	4
Chile.....			1		1		1
China.....			40	10	40	10	50
Colombia.....	5		60	41	65	41	106
Costa Rica.....	1		2	3	3	3	6
Curacao.....			4	2	4	2	6
Cuba.....	2		3	2	5	2	7
Demerara.....			3	1	3	1	4
Dominica.....			2	1	2	1	3
England.....			1	1	1	1	2
Ecuador.....			3	6	3	6	9
France.....			10	7	10	7	17
Germany.....			1	1	1	1	2
Grenada.....	3		10	20	13	20	33
Greece.....			1	3	1	3	4
Guadeloupe.....	2		9	4	11	4	15
Guatemala.....			1	1	1	1	2
Honduras.....			1	3	1	3	4
Italy.....			7	3	7	3	10
India.....	1		6		7		7
Ireland.....			2		2		2
Jamaica.....	29	3	226	232	255	235	490
Japan.....			3	2	3	2	5
Martinique.....	2		22	16	24	16	40
Mexico.....			3	1	3	1	4
Montserrat.....			5		5		5
Nassau.....			2	2	2	2	4
Nicaragua.....			3	3	3	3	6
Norway.....			2		2		2
Nevis.....			1		1		1
Panama.....	6		392	340	398	340	738
Peru.....			3	4	3	4	7
Porto Rico.....			10	8	10	8	18
Portugal.....				1		1	1
St. Kitts.....			2	1	2	1	3
St. Lucia.....	1		22	13	23	13	36
St. Thomas.....			2	6	2	6	8
St. Vincent.....			6	4	6	4	10
Scotland.....	1				1		1
Spain.....	1		26	5	27	5	32
Syria.....				1		1	1
Trinidad.....			10	12	10	12	22
United States.....	11		26	8	37	8	45
Uruguay.....			1		1		1
Venezuela.....				4		4	4
Unknown.....			4		4		4
Totals.....	90	3	1,074	902	1,164	905	2,069

TABLE VI.—STATISTICS RE AMERICAN EMPLOYEES AND THEIR FAMILIES.

	Annual death rate per 1,000 population.
White employees from the United States:	
Disease.....	2.43
External causes.....	.91
Total.....	3.34
White women and children from the United States:	
Disease.....	2.55
External causes.....	.59
Total.....	3.14
White employees from the United States and their families:	
Disease.....	2.50
External causes.....	.71
Total.....	3.21
Number of American children born on Isthmus during the year 1921.....	217
Deaths among American children under 1 year of age.....	4
Infant mortality rate among American children (number of deaths per 1,000 births)...	18.43

TABLE VII.—BIRTHS AND BIRTH RATES IN THE CANAL ZONE, AND THE CITIES OF PANAMA AND COLON.

Place.	Average population.	Births.			Rate per 1,000 population.		
		Total.	Alive.	Still-born.	Total.	Alive.	Still-born.
Year, 1921:							
Panama.....	60,500	2,311	2,173	138	38.20	35.92	2.28
Colon.....	28,789	969	919	50	33.66	31.92	1.74
Canal Zone.....	31,377	807	776	31	25.72	24.73	.99
Totals.....	120,666	4,087	3,868	219	33.87	32.06	1.81
Year, 1920:							
Panama.....	60,500	2,532	2,376	156	41.85	39.27	2.58
Colon.....	26,078	1,014	962	52	38.88	36.89	1.99
Canal Zone.....	27,459	667	631	36	24.29	22.98	1.31
Totals.....	114,472	4,213	3,969	244	36.80	34.64	2.13

TABLE VIII.—INFANT MORTALITY RATES IN THE CANAL ZONE AND THE CITIES OF PANAMA AND COLON.

Place.	Average population.	Births.			Deaths among children under 1 year of age.	Death rate per 1,000 births.
		Male.	Female.	Total.		
Year 1921:						
Panama.....	60,500	1,101	1,072	2,173	378	173.95
Colon.....	28,789	453	436	919	128	139.28
Canal Zone.....	31,377	380	396	776	75	96.65
Totals.....	120,666	1,934	1,934	3,868	581	150.21
Year 1920:						
Panama.....	60,500	1,150	1,226	2,376	369	155.30
Colon.....	26,078	503	459	962	137	142.41
Canal Zone.....	27,459	343	283	631	60	95.09
Totals.....	114,037	2,001	1,968	3,969	566	142.61

TABLE IX.—DEATHS OF INFANTS BY CAUSE.

Cause of death.	Sex.		Color.		—1 week.	+1 week —1 month.
	M.	F.	W.	B.		
Smallpox.....		2		2		
Measles.....		1		1		
Diphtheria and croup.....		1	1			
Influenza.....	1	1		2		
Dysentery, bacillary.....	4	2		6		
Purulent infection and septicemia.....		1		1		
Tetanus.....	1	1		1		1
Beriberi.....	1	1		2		
Acute miliary tuberculosis.....		2		2		
Tuberculous meningitis.....	4	2	1	5		
Disseminated tuberculosis.....	1			1		
Rickets.....	3	1		4		
Syphilis, hereditary.....	8	4		12	2	3
Acute articular rheumatism.....		1	1			
Other general diseases.....		1		1		
Encephalitis.....		1	1			
Simple meningitis.....	4	1	2	3	1	
Convulsions of infants (under 5 years of age).....		3		3		
Diseases of the ears.....		1		1		
Otitis media.....	1	2		3		
Acute endocarditis.....	1	3		4		
Organic diseases of the heart.....		1		1		
Diseases of the lymphatic system (lymphangitis, etc.).....	2			2		
Diseases of the larynx.....	2			2		1
Acute bronchitis.....	16	13	4	25		3
Chronic bronchitis.....	1	1		2		
Broncho-pneumonia.....	45	33	6	72	4	4
Pneumonia (unqualified).....	1	1		2		1
Lobar pneumonia.....	1	1		2		
Diseases of the mouth and annexa.....		1		1		
Acute gastritis.....	2	5	4	3	1	
Acute indigestion.....	1	1		2		
Diarrhea and enteritis.....	85	73	19	139	2	5
Colitis.....	1	3		4		
Hernia, intestinal obstructions.....	1			1		1
Intestinal obstruction.....	4	1		5		
Other diseases of the intestines: Duodenal ulcer.....		1		1		
Acute nephritis.....	11	8	1	18	2	
Bright's disease (chronic nephritis).....		1		1		
Other diseases of the kidney and annexa.....		1		1		
Pyelo-nephrosis.....	2	1	1	2		
Acute abscess: Phlegmon and cellulitis.....	1			1		
Congenital malformations (stillbirth not included).....	2	6	1	7	4	1
Congenital debility, icterus, and sclerema.....	16	8	2	22	15	3
Premature birth.....	31	24	10	45	46	4
Congenital debility.....	3			3	1	
Malnutrition.....	22	21	3	40		1
Other causes peculiar to early infancy (including various consequences of labor).....	33	14	7	40	39	6
Burns (conflagration excepted).....		1		1		
Absorption of deleterious gases (conflagration ex- cepted).....		1		1		
Homicide by strangulation.....	1	1		2	2	
Cause of death not specified or ill-defined.....	8	6	3	11	3	1
Infections of undetermined origin.....		1		1		
Totals.....	320	261	67	514	122	35

SEX, COLOR, AGE, AND PLACE OF RESIDENCE.

Age (by months).											Place of residence.			
1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	Panama	Colon.	Canal Zone.	Total.
1					1						1		1	2
	1										1			1
			1								1			1
				1							1		1	2
			2	1		1	1	1			3	2	1	6
	1												1	1
													1	1
		1								1	1		1	2
			1				1				1		1	2
		2			1			2	1		3	2	1	6
				1		1			1		1			1
			1	1				1	1			4		4
2	2			1	1	1					6	2	4	12
										1	1			1
				1									1	1
				1		2	1		1		1			1
1					1		1				4	1		5
						1					2	1		3
			1									1		1
				1	1					1	1	1	1	3
		1		1			1			1	3	1		4
							1					1		1
	1			1							2			2
								1			2			2
2	3	1	2	3	4	2	3	2		4	15	13	1	29
8	6	2	6	6	6	3	9	8	6	10	58	16	4	78
										1	2			2
2											2			2
										1			1	1
		1	1	2	1				1		7			7
				1		1						2		2
8	22	19	14	11	16	12	13	14	10	12	135	20	3	158
		3					1				4			4
	1	1		1	1					1	1			1
											2	2	1	5
1	2		3	2	3	1	1	1	1	2	18		1	1
							1				1			19
				1	1	1			1		1			1
											1			1
			1	1	1						2	1		3
		1											1	1
1	1	1									5	1	2	8
2	3	1									10	10	4	24
3	2										27	15	13	55
	1	1										3		3
6	1	4	6	4	5	3	2	5	4	2	12	17	14	43
			1	1							32	6	9	47
								1				1		1
					1								1	1
											2			2
			4	1	2		1		1	1	7	2	5	14
			1									1		1
37	47	40	47	40	45	27	38	39	26	38	378	128	75	581

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>General diseases.</i>								
Typhoid fever.....	1		2		1			
Typhoid bacillus carrier.....								
Typhoid prophylaxis.....	1							
Paratyphoid fever.....							1	
Relapsing fever.....	4		1					
Malaria:								
Estivoautumnal.....	34	1	69	2				
Tertian.....	28	0	47	3				
Quartan.....	1							
Mixed.....	1		1	1				
Undetermined.....								
Clinical.....			1					
Hemoglobinuric fever, malarial.....								
Smallpox.....	1		21					
Varioloid.....			6					
Vaccinia.....								
Measles.....	3		11					
Scarlet fever.....		1	1					
Whooping cough.....								
Diphtheria and croup.....		2	2					
Croup.....								
Diphtheria bacillus carrier.....								
Influenza.....	52	14	40	2				
Dysentery.....								
Entamebic.....	3	1	2					
Bacillary.....	1	1	1	2				
Unclassified.....								
Leprosy.....			1					
Erysipelas.....	10		4					
Dengue.....			1					
Chicken pox.....	1		24	2				
Mumps.....	7	3	82	3				
Yaws.....	1							
Filariasis.....			3					
Acute infectious jaundice (Weil's disease).....								
Purulent infection and septicemia.....	5	3	8					
Septicemia.....		1	1					
Tetanus.....								
Mycosis.....								
Pellagra.....			2				1	
Tuberculosis of the lungs.....	11		15				6	
Acute miliary tuberculosis.....								
Tuberculous meningitis.....								
Abdominal tuberculosis.....								

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>General diseases.—Continued.</i>								
Pott's disease.....			2				1	
Tuberculosis of bones and joints.....								
Tuberculosis of other organs.....							1	
Tuberculosis of the skin.....			1					
Tuberculosis of the lymph glands.....	1							
Tuberculosis of the genito-urinary organs.....								
Disseminated tuberculosis.....								
Rickets.....								
Syphilis, primary.....	1		7					
Syphilis, secondary.....			4					
Syphilis, tertiary.....	7		62	3			2	
Syphilis, cerebrospinal.....	8		8					
Syphilis, hereditary.....								
Syphilis, period not stated.....			1	1				
Gonococcus infection.....	1		1					
Gonorrhea.....	8		105					
Gonorrheal arthritis.....			7					
Gonorrheal bubo.....			1					
Gonorrheal orchitis and epididymitis.....	3		14					
Gonorrheal ophthalmia.....			3					
Soft chancre.....	8		52					
Adenitis chancroidal.....	1		2					
Cancer and other malignant tumors of the stomach and liver.....	1		3				1	
Cancer and other malignant tumors of the peritoneum, intestines, rectum.....	1				1			
Cancer and other malignant tumors of the female genital organs.....								
Cancer and other malignant tumors of the breast.....		1						
Cancer and other malignant tumors of the skin.....								
Cancer and other malignant tumors of other organs and of organs not specified.....			1				1	
Other tumors (tumors of the female genital organs excepted).....	5	2	1					
Acute articular rheumatism.....	1		2					
Chronic rheumatism and gout.....			1					
Gout.....								
Arthritis deformans.....								
Diabetes.....			1					
Leukemia lymphatic.....								
Hodgkin's disease.....								
Anemia, chlorosis.....	1						1	
Secondary, cause not determined.....	1	1	1					
Other general diseases.....	1							
Purpura hemorrhagica.....								

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>General diseases—Continued.</i>								
Alcoholism (acute or chronic).....	7							
Alcoholism, acute.....	9		3					
Alcoholism, chronic.....	1							
Alcoholic psychosis.....	1							
Chronic lead poisoning.....								
Other chronic poisonings.....								
Drug habit.....								
<i>Diseases of the nervous system and of the organs of special sense.</i>								
Encephalitis.....								
Simple meningitis.....								
Cerebrospinal fever.....			1					
Pneumococcus meningitis.....							1	
Locomotor ataxia.....	1		1					
Other diseases of the spinal cord.....	1		2					
Acute anterior polio-myelitis.....								
Lateral sclerosis.....								
Cerebral hemorrhage, apoplexy.....			1				2	
Softening of the brain.....			1				1	
Paralysis without specified cause.....	4		2					
General paralysis of the insane.....	1						2	
Other forms of mental alienation.....	6	1	6					
Dementia precox.....	2		3					
Manic depressive psychosis.....		1						
Toxic psychosis.....								
Epilepsy.....	1		5					
Convulsions of infants (under 5 years of age).....								
Hysteria.....	1	1						
Neuralgia.....			3	1				
Neuritis.....	8	1	10					
Other diseases of the nervous system.....	6	1	4					
Imbecility.....	1							
Organic disease of the brain.....			1					
Tumor of the brain.....					1			
Neurasthenia.....	5	2	2					
Diseases of the eyes and their annexa.....	12		35	2				
Follicular conjunctivitis.....	1		3					
Trachoma.....								
Cornea.....	10		23					
Iris.....	1	1	12					
Lens.....			4					
Fundus.....								
Disease of the ears.....	1							
Otitis, external.....	1		7	1				
Otitis media.....	6	1	7	2				
Otitis, internal.....								

OF THE PANAMA CANAL FOR THE YEAR 1921.—Continued.

Nonemployees.										Nonresidents.								Total discharges.	Total deaths.
Discharges.					Deaths.					Discharges.				Deaths.					
White.			Black.		White.			Black.		White.		Black.		White.		Black.			
Soldiers.	Others.				Soldiers.	Others.													
	M.	M.	F.	M.		F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
3	3		3	1						1								14	
13		2								2								31	
1	1	1	1							3								3	
	1			1														8	
1							1											1	
1								1		2								2	
																		3	1
1			1	1				1										3	1
1								1										1	1
									1						1			1	2
	1		1							1								4	
																		4	
			3															3	
																		1	
1						1		1	3	2		1						4	7
									1									1	3
			1	2														11	
2		1	1	1		2		3	3	1								6	10
14	1	2	5	13					1				2					50	1
21	6	9	15	20					1	5	1							82	1
1	1			6					1	1								10	1
			1	2														3	
2	2	2	6	11														29	
				1														1	1
12	1	4	2	4														25	
1			2								1							8	
3	1	3	2	1						4								33	
11		2	2	2						1		1						30	
1	2	3		1														8	
	1	1	3	3														9	
																		1	1
16	3	11		4						7	1	1						52	
38	4	4	6	36						5		2						144	
3			1	4						2								14	
				1														1	
10	2	2	4	13						2								66	
10			4	3						2								33	
1		2		2														9	
4			1															5	
2		1	1	1														6	
23	3	2		3						2								42	
27	18	16	11	7			4	1		6								101	5
				1								1						3	

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Diseases of the circulatory system.</i>								
Pericarditis.....	1							
Acute endocarditis.....			1				1	
Malignant endocarditis.....							1	
Organic diseases of the heart.....	4	2	9	2	1		6	
Angina pectoris.....			1				1	
Diseases of the arteries, atheroma, aneurysm, etc.								
Aneurysm.....							1	
Arteriosclerosis.....	2	1	6					
Embolism and thrombosis.....								
Diseases of the veins (varices, hemorrhoids, phlebitis, etc.).....	3	1	4					
Hemorrhoids.....	18	4	22	1				
Varices.....								
Varicocele.....	6		3					
Phlebitis.....			3					
Diseases of the lymphatic system (lymphangitis, etc.).....	2	1	4	1				
Lymphadenitis (nonvenereal).....	11		37					
Hemorrhage; other diseases of the circulatory system.....			1					
<i>Diseases of the respiratory system.</i>								
Diseases of the nasal fossæ.....	36	8	43					
Adenoid vegetations.....								
Myiasis of nasal fossæ and sinuses.....	1		1					
Diseases of the larynx.....								
Laryngitis.....	1		3	2				
Diseases of the thyroid body.....	1	2						
Acute bronchitis.....	67	11	37	2				
Chronic bronchitis.....	14		2					
Broncho-pneumonia.....	1		1					
Pneumonia (unqualified).....			1					
Lobar pneumonia.....			15	1			8	
Pleurisy.....	2	3	8					
Empyema.....			1					
Pulmonary congestion, pulmonary apoplexy.....	1							
Gangrene of the lungs.....								
Asthma.....	3		12	1				
Other diseases of the respiratory system (tuberculosis excepted).....	1	1						
Abscess of lungs.....			2				1	

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Diseases of the digestive system.</i>								
Diseases of the mouth and annexe.....	1		3					
Diseases of the teeth and gums.....	6	1	9	1				
Stomatitis.....								
Diseases of the pharynx.....		1	5	1				
Pharyngitis.....	1		6					
Follicular tonsillitis.....	32	22	47	3				
Diseases of the esophagus.....								
Stricture of the esophagus.....								
Ulcer of the stomach.....	2		4					
Other diseases of the stomach (cancer excepted)....	11	4	1					
Gastrextasis.....	1							
Acute gastritis.....	3	1	3					
Chronic gastritis.....	3							
Acute indigestion.....	10		3					
Diarrhea and enteritis (under 2 years).....								
Colitis.....			1					
Diarrhea and enteritis (2 years and over).....	7		4					
Colitis.....	3	1	3	2				
Ankylostomiasis.....	4		20	1				
Intestinal parasites.....			1					
Ascariasis.....			1					
Bilharziasis, intestinal.....								
Teniasis.....	1							
Strongyloidosis.....								
Acute appendicitis.....	16	7	12	1			2	
Chronic appendicitis.....	6	3						
Hernia, intestinal obstructions.....								
Inguinal hernia.....	23		51					
Other hernias.....	2		5					
Intestinal obstruction.....		1	1					
Other diseases of the intestines.....	15	3	12					
Constipation.....	9	2	4	2				
Duodenal ulcer.....	9		2		1			
Acute yellow atrophy of the liver.....								
Cirrhosis of the liver.....		1	3					
Biliary calculi.....			1					
Other diseases of the liver.....	3	1	2					
Abscess of liver (unqualified).....								
Abscess of the liver, entamebic.....			2				1	
Cholecystitis.....	2	2	2		1			
Diseases of the spleen.....			1				1	
Simple peritonitis (nonpuerperal).....			1	2				
Other diseases of the digestive system (cancer and tuberculosis excepted).....			2	1				

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Nonvenereal diseases of the genito-urinary system and annexa.</i>								
Acute nephritis.....								
Bright's disease (chronic nephritis).....	5	1	11		1		6	1
Other diseases of the kidney and annexa.....	6	1	4	5				
Movable kidney.....								
Pyelo-nephrosis.....	1	3	3				1	
Calculi of the urinary passages.....	4		6					
Diseases of the bladder.....	1			1				
Cystitis.....	8	4	4	1				
Diseases of the urethra, urinary abscess, etc.....	1		11					
Stricture of the urethra, nonvenereal.....	1		14				1	
Diseases of the prostate.....			1					
Acute prostatitis.....								
Chronic prostatitis.....			1					
Abscess of the prostate.....								
Hypertrophy of prostate.....	2							
Nonvenereal diseases of the male genital organs.....	10		40					
Hydrocele.....	1		7					
Uterine hemorrhage (nonpuerperal).....		1						
Uterine tumor (noncancerous).....								
Other diseases of the uterus.....		5		1				
Metritis.....				1				
Cysts and other tumors of the ovary.....		2						
Salpingitis and other diseases of the female genital organs.....		3		6				
Nonpuerperal diseases of the breast (cancer excepted).....								
Benign tumor of breast.....								
<i>The puerperal state.</i>								
Normal labor.....		1		1				
Accidents to pregnancy.....				1				
Extra-uterine pregnancy.....								
Hyperemesis gravidarum.....				1				
Abortion.....		2		1				
Puerperal hemorrhage.....								
Other accidents of labor.....		1						
Puerperal septicemia.....								
Puerperal albuminuria and convulsions.....								
Eclampsia.....								
Puerperal phlegmasia alba dolens, embolus, sudden death.....								
Following childbirth (not otherwise defined).....								
Puerperal diseases of the breast.....								

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Diseases of the skin and of the cellular tissue.</i>								
Gangrene.....								
Raynaud's disease.....								
Furuncle.....	2		2					
Carbuncle.....	5		4					
Acute abscess.....	15	1	22	2				
Phlegmon and cellulitis.....	6	2	15	1				
Trichophytosis.....			1					
Scabies.....	1		3					
Dhobie itch.....	3		6					
Ulcer of the skin.....	1		14	1				
Tropical ulcer.....								
Impetigo contagiosa.....	1	1	1					
Urticaria.....			1					
Ingrowing nail.....	9	2		1				
Other diseases of the skin and annexe.....	16	5	21	3				
<i>Diseases of the bones and of the organs of locomotion.</i>								
Diseases of the bones (tuberculosis excepted).....	2		6					
Mastoid abscess.....			2	1				
Osteomyelitis.....								
Periostitis.....	1		2					
Diseases of the joints (tuberculosis and rheumatism excepted).....			2	1				
Ankylosis.....			1					
Arthritis.....	3	1	13					
Synovitis.....	1		3					
Amputations.....								
Other diseases of the organs of locomotion.....	10	1	17					
<i>Malformations.</i>								
Congenital malformations (stillbirth not included) ..	2		5					
<i>Diseases of early infancy.</i>								
Newborn child.....								
Congenital debility, icterus, and sclerema.....								
Premature birth.....								
Congenital debility.....								
Malnutrition.....								
Other causes peculiar to early infancy (including various consequences of labor).....								

TABLE X.—DISCHARGES AND DEATHS IN THE HOSPITALS

Diseases.	Employees.							
	Discharges.				Deaths.			
	White.		Black.		White.		Black.	
	M.	F.	M.	F.	M.	F.	M.	F.
<i>Old age.</i>								
Senility.....								
Senile dementia.....								
<i>Affections produced by external causes.</i>								
Suicide by poisoning.....								
Other suicides.....								
Poisoning by food.....	8	3	11	2				
Other acute poisonings.....	1		1					
Venomous bites and stings.....		1						
Snake bites.....								
Conflagration.....	1							
Burns (conflagration excepted).....	4		18					
Accidental drowning.....	1							
Traumatism by firearms.....	1		4					
Traumatism by cutting or piercing instruments.....	3		28					
Traumatism by fall.....	21		57	3				
Traumatism by machines.....	1	1	23					
Traumatism by other crushings (vehicles, railroads, landslides, etc.).....	5		27				3	
Railroad traumatism.....			4					
Dynamite traumatism.....								
Traumatism by landslides.....			1					
Injuries by animals.....	2		1					
Effects of heat.....								
Heat exhaustion.....			1					
Electricity (lightning excepted).....	1		1					
Homicide by firearms.....								
Homicide by cutting or piercing instruments.....								
Homicide by other means.....								
Fractures (cause not specified).....	3		1					
Dislocations.....			1					
Sprains.....		2	13	1				
Other external violence.....	30	1	177				1	
<i>Ill-defined diseases.</i>								
Ill-defined organic disease.....			1					
Infections of undetermined origin.....	11	3	30					
No disease.....	6		27					
Feigned disease.....								
Totals.....	805	176	1861	83	7	....	56	1

OF THE PANAMA CANAL FOR THE YEAR, 1921.—Continued.

Nonemployees.										Nonresidents.											
Discharges.					Deaths.					Discharges.					Deaths.					Total discharges.	Total deaths.
White.			Black.	White.			Black.	White.		Black.	White.		Black.	White.		Black.					
Soldiers.	Others.			Soldiers.	Others.			M.	F.		M.	F.		M.	F.		M.	F.	M.			F.
M.	M.	F.	M.	F.	M.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.				
								1										1	1		
			1															1			
										1									1		
2	2	3	3	3						1		1						38			
2		2	2	5					1	1								14	1		
			1															1			
																		1			
5	1	1	2	2	1					12		1						47	1		
13	1		7	1	2					1								28	2		
10	8		10	4						4		3						70			
15	18	19	26	12					1	18		1						190	1		
3	1		2							3		1						35			
12	3	2	14	2		1		1	2									65	7		
1		2																7			
1																		1			
																		1			
10	1			2						1								17			
										2								2			
										1								2			
						1		2										2			
									1							1			4		
																		1			
4			2			1				3								13			
3			1	1						1								7			
9		3	1							1								30			
54	8	4	18	13						21		7						333	1		
1	1								3	1								4	3		
10	13	4	7	7						8								93			
24	28	89	26	71						13	10	1						295			
3			1	11														15			
1603	717	1381	848	1682	15	22	16	91	131	537	51	107	...	13	4	1	..	9911	357		

TABLE XI.—CONSOLIDATED HOSPITAL AND ASYLUM REPORT.

(A. = White Americans; F. = White foreigners; B = Black.)

	Remain- ing January 1, 1921.			Admitted.			Died.			Discharged.		
	A.	F.	B.	A.	F.	B.	A.	F.	B.	A.	F.	B.
Ancon Hospital:												
Employees.....	30	6	86	703	106	1,633	5	1	44	708	107	1,601
Army and Navy patients.....	63			1,425			11			1,403		
Panama pay patients.....					12	175		1	1		9	145
Other pay patients.....	49	31	47	1,283	578	1,695	15	17	113	1,270	558	1,545
Charity patients.....	16	1	13	216	42	345			15	223	36	310
Totals.....	158	38	146	3,630	738	3,848	31	19	173	3,604	710	3,601
Corozal Hospital (insane):												
Employees.....	1	2	24	3		8			1	1	2	7
Army and Navy patients.....	1			36						34		
Panama pay patients.....	3	62	196	4	31	70		5	14	2	29	43
Other pay patients.....	1	1	21	11	11	29			4	8	10	16
Charity patients.....	2	8	55	1	5	17			2	2	4	17
Totals.....	8	73	296	55	47	124		5	21	47	36	83
Grand totals.....	166	111	442	3,685	785	3,972	31	24	194	3,651	746	3,684
Corozal farm (cripples):												
Employees.....		4	26	19	2	54			2	17	1	35
Chronic ward:												
Charity patients.....		1	25			7			2			3
Colon Hospital:												
Employees.....	1	1	10	225	44	463	1		12	187	36	336
Army and Navy patients.....				223	19		3			130	11	
Panama pay patients.....			1	10	14	255	1	2	17		2	59
Other pay patients.....	6	7	10	369	217	653	4	7	43	315	177	417
Charity patients.....	2		2	69	17	183	2	2	14	60	15	85
Totals.....	9	8	23	896	311	1,554	11	11	86	692	241	897
Palo Seco Leper Asylum:												
Panama pay patients.....		7	37		1	6		1	3		1	
Charity patients.....			30			4			1			1
Totals.....		7	67		1	10		1	4		1	1
Grand totals:												
Employees.....	32	13	146	950	152	2,158	6	1	59	913	146	1,979
Army and Navy patients.....	64			1,684	19		14			1,567	11	
Panama pay patients.....	3	69	234	14	58	506	1	9	35	2	32	247
Other pay patients.....	56	39	78	1,666	806	2,377	19	24	160	1,593	745	1,978
Charity patients.....	20	10	125	286	64	556	2	2	34	285	55	416
Totals.....	175	131	583	4,600	1,099	5,597	42	36	288	4,360	989	4,620

TABLE XI.—CONSOLIDATED HOSPITAL AND ASYLUM REPORT.—Continued.
(A. = White Americans; F. = White foreigners; B. = Black.)

	Trans- ferred.			Remain- ing December 31, 1921.			Average number con- stantly in hospital.			
	A.	F.	B.	A.	F.	B.	A.	F.	B.	Total.
Ancon Hospital:										
Employees.....	5		25	15	4	49	20.27	4.92	81.22	106.41
Army and Navy patients.....	21			53			66.29			66.29
Panama pay patients.....		2	24			5		.60	9.98	10.58
Other pay patients.....	9	10	22	41	24	62	39.75	27.42	68.36	135.53
Charity patients.....	1	4	24	8	3	9	7.35	1.73	14.54	23.62
Totals.....	36	16	95	117	31	125	133.66	34.67	174.10	342.43
Corozal Hospital (insane):										
Employees.....				3		24	2.26	.59	21.08	23.93
Army and Navy patients.....				3			2.56			2.56
Panama pay patients.....			7	5	68	202	4.67	63.43	193.11	261.21
Other pay patients.....			1	4	2	29	2.68	3.68	23.70	30.06
Charity patients.....		1	1	1	8	52	1.09	8.99	52.61	62.69
Totals.....		1	9	16	78	307	13.26	76.69	290.50	380.45
Grand totals.....	36	17	104	133	109	432	146.92	111.36	434.60	722.88
Corozal farm (cripples):										
Employees.....	2		13		5	30		3.91	26.01	29.92
Chronic ward:										
Charity patients.....			3		1	24		1.59	25.25	26.84
Colon Hospital:										
Employees.....	36	8	115	2	1	10	3.24	.76	9.98	13.98
Army and Navy patients.....	87	7		3	1		4.05	.29		4.34
Panama pay patients.....	9	10	179			1	.08	.11	1.56	1.75
Other pay patients.....	48	37	193	8	3	10	6.38	4.55	9.68	20.61
Charity patients.....	4		85	5		1	1.76	.37	9.67	11.80
Totals.....	184	62	572	18	5	22	15.51	6.08	30.89	52.48
Palo Seco Leper Asylum:										
Panama pay patients.....					6	40		5.97	39.27	45.24
Charity patients.....						32			30.98	30.98
Totals.....					6	72		5.97	70.25	76.22
Grand totals:										
Employees.....	43	8	153	20	10	113	25.77	10.18	138.29	174.24
Army and Navy patients.....	108	7		59	1		72.90	.29		73.19
Panama pay patients.....	9	12	210	5	74	248	4.75	70.11	243.92	318.78
Other pay patients.....	57	47	216	53	29	101	48.81	35.65	101.74	186.20
Charity patients.....	5	5	113	14	12	118	10.20	12.68	133.05	155.93
Totals.....	222	79	692	151	126	580	162.43	128.91	617.00	908.34

TABLE XII.—CONSOLIDATED DISPENSARY REPORT.

EMPLOYEES TREATED IN QUARTERS.

Place.	Re-main- ing Jan. 1, 1921.		Ad- mitted.		Died.		Dis- charged.		Trans- ferred.		Re-main- ing Dec. 31, 1921.		Days lost.		
	W.	B.	W.	B.	W.	B.	W.	B.	W.	B.	W.	B.	W.	B.	Total.
Ancon.....	1	8	1,060	1,298	...	...	1,030	1,247	29	56	2	3	2,870	4,722	7,592
Balboa.....	6	1	1,356	30	...	...	1,352	31	...	...	10	...	3,763	183	3,946
Pedro Miguel....	...	...	206	148	...	...	198	133	8	14	...	1	727	401	1,128
Gatun.....	1	...	148	81	...	...	146	76	3	4	...	1	578	269	847
Cristobal....	9	12	757	982	...	...	731	931	33	49	2	14	2,493	6,190	8,683
Totals....	17	21	3,527	2,539	...	...	3,457	2,418	75	123	14	19	10,431	11,765	22,196

ALL CASES TREATED BUT NOT EXCUSED.

Place.	Employees.			Nonemployees.			Total.		
	White.	Black.	Total.	White.	Black.	Total.	White.	Black.	Total.
Ancon.....	13,059	46,797	59,856	12,959	17,898	30,767	26,018	64,605	90,623
Balboa.....	39,668	18,951	58,619	45,993	12,274	58,267	85,691	31,225	116,895
Pedro Miguel....	9,139	17,710	26,849	14,574	21,720	36,294	23,713	39,430	63,143
Gatun.....	4,878	19,394	24,272	8,184	12,892	21,076	13,062	32,286	45,348
Cristobal.....	10,632	30,002	40,634	13,548	20,296	33,844	24,180	50,233	74,473
Totals.....	77,376	132,854	210,230	95,258	84,990	180,248	172,634	217,844	390,478

TABLE XIII.—CONSOLIDATED ADMISSION REPORT.

	White.	Black.	Total.
Admission to hospitals, excluding Corozal farm and chronic ward.....	5,678	5,536	11,214
Admissions of employees to quarters.....	3,527	2,539	6,066
Total admissions to hospitals and quarters.....	9,205	8,075	17,280
Less number of patients transferred between hospitals and from quarters to hospitals, whose admissions are duplicated in the above figures.....	374	815	1,189
Net admissions to hospitals and quarters.....	8,831	7,260	16,091
EMPLOYEES.			
Employees admitted to hospitals.....	1,102	2,158	3,260
Employees admitted to quarters.....	3,527	2,539	6,066
Total admissions of employees.....	4,629	4,697	9,326
Less number transferred between hospitals and from quarters to hospitals, whose admissions are duplicated in the above figures.....	124	276	400
Net admissions of employees.....	4,505	4,421	8,926
Annual admission rate per thousand employees to hospitals and quarters.....	1,168.60	419.69	620.33

TABLE XIV.—NUMBER OF EMPLOYEES CONSTANTLY SICK IN HOSPITALS AND QUARTERS.

	White.	Black.	Total.
Hospitals:			
Ancon.....	27.57	98.34	125.91
Colon.....	4.01	10.09	14.10
Total.....	31.58	108.43	140.01
Quarters:			
Ancon.....	7.86	12.94	20.80
Balboa.....	10.31	.50	10.81
Pedro Miguel.....	1.99	1.10	3.09
Gatun.....	1.58	.74	2.32
Colon.....	6.83	16.96	23.79
Totals.....	28.57	32.24	60.81

TABLE XV.—AVERAGE NUMBER OF DAYS IN HOSPITALS AND IN QUARTERS FOR EACH ADMISSION OF SICK EMPLOYEE.

	White.	Black.	Total.
Hospitals:			
Ancon.....	11.58	20.61	17.63
Colon.....	5.25	7.11	6.45
Totals (average).....	9.92	17.37	14.86
Quarters:			
Ancon.....	2.75	3.69	3.27
Balboa.....	2.83	6.03	2.90
Pedro Miguel.....	3.39	2.74	3.11
Gatun.....	4.24	3.39	3.93
Colon.....	3.07	5.91	4.66
Totals (average).....	2.95	4.51	3.60

TABLE XVI.—NUMBER OF DAYS HOSPITAL TREATMENT FURNISHED VARIOUS CLASSES OF PATIENTS.

Class.	American.	Foreign.	Black.	Total.
Ancon Hospital:				
Employees.....	7,400	1,794	29,645	38,839
Army and Navy patients.....	24,195			24,195
Panama pay patients.....		217	3,644	3,861
Other pay patients.....	14,509	10,006	24,952	49,467
Charity patients.....	2,682	630	5,305	8,617
Totals.....	48,786	12,647	63,546	124,979
Corozal Hospital (insane):				
Employees.....	826	214	7,694	8,734
Army and Navy patients.....	934			934
Panama pay patients.....	1,703	23,151	70,484	95,338
Other pay patients.....	978	1,345	8,650	10,973
Charity patients.....	396	3,282	19,204	22,882
Totals.....	4,837	27,992	106,032	138,861
Corozal farm (cripples):				
Employees.....		1,428	9,492	10,917
Chronic ward:				
Charity patients.....		582	9,215	9,797
Colon Hospital:				
Employees.....	1,182	276	3,644	5,102
Army and Navy patients.....	1,480	105		1,585
Panama pay patients.....	30	39	570	639
Other pay patients.....	2,330	1,660	3,531	7,521
Charity patients.....	641	135	3,531	4,307
Totals.....	5,663	2,215	11,276	19,154
Palo Seco Leper Asylum:				
Panama Government pay patients.....		2,178	14,332	16,510
Charity patients.....			11,306	11,306
Totals.....		2,178	25,638	27,816

TABLE XVII.—WARD LABORATORY REPORTS.

	Ancon Hospital.	Colon Hospital.	Santo Tomas Hospital.
Blood examinations (total number).....	5,976	2,336	2,046
Estivo-autumnal.....	303	99	296
Tertian.....	229	103	166
Mixed, tertian and estivo-autumnal.....	16	3	
Quartan.....	8	2	
Filaria.....	3	1	
Spirillum of relapsing fever.....	13		
White blood counts.....	2,781	383	951
Red blood counts.....	755	14	183
Differential counts.....	687	212	587
Hemoglobin estimations.....	3,537	81	729
Stool examinations (total number).....	6,532	2,138	6,409
Ameba coli.....	48	11	50
Entameba histolytica.....	33	3	123
Uncinaria ova.....	365	179	2,138
Ascaris ova.....	296	51	714
Tricocephalus dispar.....	453	140	494
Bilharzia ova.....	5		
Tinea saginata.....	10	3	1
Strongyloides.....	177	79	301
Trichuris.....	23	11	118
Oxyuris.....		8	
Ciliated monads (includes cercomonas hominis and trichomonas vaginalis).....	95	17	144
Balantidium coli.....	12	1	2
Pus cells.....	179	114	1,890
Blood corpuscles.....	99	41	1,004
Pus and blood.....	77	3	71
Pus, blood, and mucus.....	193	10	453
Guaiac test for occult blood.....	219	25	6
Tubercle bacilli.....	1		
Urine examinations (total number).....	20,130	5,255	8,158
Acetone.....	1,198	330	14
Diacetic acid.....	162	4	5
Albumen.....	4,394	2,448	2,399
Sugar.....	1,106	42	41
Bile.....	224	49	25
Indican.....	30		
Guaiac test for occult blood.....	90	20	10
Sediment.....	4,680	566	4,551
Epithelial cells.....	5,193	1,279	690
Cylindroids.....	194	15	256
Hyaline casts.....	1,728	479	1,673
Granular casts.....	1,251	469	906
Pus casts.....	638	23	103
Pus cells.....	6,809	2,900	624
Red blood corpuscles.....	1,370	523	300
Pus and blood.....	1,223		22
Ciliated monads.....		49	
Gonococci.....	4		8
Urobilin.....	3		
Tubercle bacilli.....	1		
Hemin crystals.....	93		5
Functional kidney tests.....	73	5	12
Sputum (total examinations).....	2,983	1,546	1,729
Tubercle bacilli.....	295	41	519
Pneumococci.....	3	1	67

TABLE XVII.—WARD LABORATORY REPORTS.—Continued.

	Ancon Hospital.	Colon Hospital.	Santo Tomas Hospital.
Spinal fluid.....	654	23	36
Smears of sediment.....	145	2	36
Pneumococcus.....	1		
Meningococcus.....	1		
Influenzal.....	7		
Tuberculosis.....	6		
Cell count.....	501	1	29
Intracellular diplococci.....		1	
Ross Jones test.....	42		
Smear examinations (total number).....	1,003	292	4,101
Urethral.....	483	162	765
Vaginal.....	471	77	3,070
Eyes.....	46	29	25
Nasal.....	5		34
Blood.....	7		
Throat.....	26	14	142
Indican.....	121		
Prostate.....	17	1	
Ulcers.....	8		
Others.....	30	1	63
Widal reactions.....	6		52

TABLE XVIII.—SURGICAL OPERATIONS PERFORMED.

	Ancon Hospital.		Colon Hospital.		Santo Tomas Hospital.
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.
Amputations:					
Arm.....			1		4
Forearm.....					3
Hand.....					1
Foot.....	1				4
Thigh.....			1		
Leg.....	2		1		17
Digits, multiple.....	10		1		17
Operations on bones:					
Laminectomy.....	1				1
Craniectomy, decompressive.....	1		1	1	3
Osteotomy.....	9		6		3
Wiring of fractures, simple.....	8		2		1
Wiring of fractures, compound.....	4				
Plating of fractures, simple.....	2				
Teeth extractions.....	99				
Craniectomy, exploratory.....	2	1	2		
Resection of ankle.....					2
Resection of elbow.....					1
Resection of knee.....					3
Resection of wrist.....					2
Lane plate, humerus.....	2				
Lane plate, tibia.....	2				
Bone transplantation, simple.....	3				
Adenectomy:					
Cervical.....	12		1		10
Inguinal, single.....	176		2		166
Inguinal, double.....	36				38
Femoral.....	11				4
Axillary.....	8				
Herniotomy:					
Inguinal, single.....	104		35	1	127
Inguinal, double.....	20		18		22
Ventral.....	12		4		16
Combined.....					4
Strangulated.....	1		4		4
Femoral.....	2				2
Genito-urinary tract:					
Nephropexy.....	2				3
Cystotomy.....	1		1		6
Prostatectomy.....	1				6
Urethrotomy, internal.....	28	1			40
Urethrotomy, external.....	13				22
Varicocele, radical cure.....	27		1		4
Hydrocele, single, radical cure.....	39		4		20
Hydrocele, double, radical cure.....	1				12
Orchidectomy.....	6		2		18
Epididymotomy.....	75				22
Vasectomy.....	5				
Amputation of scrotum.....	15				4
Amputation of penis.....					2
Curettage uteri.....	190		15		174
Perineoplasty.....	21		1		5
Nephrectomy.....	2				
Nephrotomy.....	1				
Trachelorrhaphy.....	7				3
Vaginal puncture.....	2				1
Vaginal section.....					4
Epididymectomy.....	6				

TABLE XVIII.—SURGICAL OPERATIONS PERFORMED.—Continued.

	Ancon Hospital.		Colon Hospital.		Santo Tomas Hospital.
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.
Genito-urinary tract—Continued:					
Circumcision.....	221				
Ureterotomy.....	1				
Perine phritic abscess, drainage of.....	2				
Obstetrical:					
Cesarian section.....	3		7	3	3
High forceps.....	4				1
Low forceps.....	14		8		
Accouchement forceps.....			2	1	
Version.....	4				
Perineorrhaphy.....	21		2		17
Thoractomy.....	1				
Thorax:					
Stab wound of chest, operation for.....			1	1	
Excision of breast.....	1		1		1
Excision of breast and axilla.....	3		1		1
Thoractomy.....	7	1			3
Thoracoplasty.....	1	1			
Rectum:					
Hemorrhoids, radical cure.....	91		33		36
Fistula in ano, excision of.....	3		7		10
Prolapsus, rectum, radical cure.....	1				4
General:					
Thyroidectomy.....	7				1
Varicose veins, excision of.....	17		2		4
Tenorrhaphy.....	7		3		3
Excision of surface neoplasms.....	1		5		
Operation for stab wounds of soft parts.....			3		
Operation for gunshot wounds of soft parts.....	2		1		2
Operation for extensive injuries to soft parts.....	1		7		
Aneurismorrhaphy.....					2
Plastic operations for severe injuries.....					1
Plastic operations for congenital defects.....	3		1		
Plastic operations for effects of disease.....	11				1
Nerve stretching.....	3				2
Skin graft.....	5				8
Laparotomy:					
For general peritonitis.....	2		3	3	
Partial resection of stomach.....	1				
Intestinal obstruction.....	1	1	5	1	5
Exploratory.....	23	2	1		41
Gastro-enterostomy.....	4		2	1	9
Entero-enterostomy.....	2	1			
Enterectomy.....	1				
Appendectomy.....	156		98		278
Appendectomy with local peritonitis.....	19		13		
Appendectomy with general peritonitis.....	20	1	2	2	7
Colostomy.....					1
Cholecystotomy.....	2				
Cholecystostomy.....	6		2		7
Cholecystectomy.....	8				9
Choledochotomy.....					5
Abscess of liver, laparo-hepatotomy.....	2	1			6
Abscess of liver, thoraco-hepatotomy.....	1				2
Pan-hysterectomy.....	3	1	7		23
Splenectomy.....	1	1			3
Supravaginal hysterectomy.....	18		7	1	68
Hysteromyomectomy.....	16		7		4
Myomectomy.....	2		5		4

TABLE XVIII.—SURGICAL OPERATIONS PERFORMED.—Continued.

	Ancon Hospital.		Colon Hospital.		Santo Tomas Hospital.
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.
Laparotomy—Concluded:					
Salpingectomy.....	3				
Salpingectomy, single.....	15		3		55
Salpingectomy, double.....	8		8		93
Salpingo-oophorectomy.....	29		8		81
Ovarian cystectomy.....	11		7	1	25
Oophorectomy.....	10		12		63
Plastic operation for chronic peritonitis.....			10	1	1
Suspensio-uteri.....	61	1	30		89
Ectopic gestation.....	5		1		2
General peritonitis.....			1	1	
Enterorrhaphy.....	1				
Rupture of spleen.....			1	1	
Gunshot wound of abdomen.....	1		3	1	
Cauterizations.....	125				
Arsphenamine intravenous.....	1,312				
Major operations, various.....	34	1			95
Minor operations, various.....	1,425	1	103		647
Salvarsan.....	414		250		
Totals.....	5,146	15	776	20	2,514

TABLE XIX.—OPERATIONS IN THE EYE, EAR, NOSE, AND THROAT CLINICS.

	Ancon Hospital.	Santo Tomas Hospital.
Eye:		
Advancement.....	14	.....
Cataract extraction.....	4	.....
Simple.....	1	43
Combined.....	1	.....
Chalazion, removal.....	42	.....
Enucleation.....	7	9
Foreign body, removal.....	68	38
Hordeolum, incision.....	7	.....
Iridectomy.....	3	4
Lachrymal operations:		
Dilation of ducts.....	14	.....
Dissection of sac.....	1	.....
Lid operations:		
Entropion.....	.....	1
Expression of lids.....	6	.....
Plastic.....	4	1
Needling.....	8	.....
Pterygium.....	85	8
Orbital abscess drainage.....	2	.....
Tenotomy.....	9	1
Minor.....	4	.....
Ear:		
Furuncle, incision.....	7	2
Foreign body, removal.....	7	12
Mastoid operation—		
Simple.....	41	8
Radical.....	8	3
Paracentosis.....	113	.....
Plastic.....	9	.....
Polypi, removal.....	3	.....
Curettement, middle ear.....	3	.....
Nose:		
Cauterization.....	3	.....
Foreign body, removal.....	3	6
Plastic.....	7	.....
Polypi, removal.....	4	3
Rhinoplasty.....	8	.....
Sinuses—		
Ethmoid, simple.....	13	.....
Frontal, simple.....	14	.....
Frontal, radical.....	4	1
Maxillary, puncture and irrigation.....	45	1
Maxillary, radical.....	5	.....
Sphenoid, simple.....	2	.....
Submucous resection.....	67	.....
Turbinectomy.....	24	15
Minor.....	4	.....
Pharynx:		
Adenoidectomy.....	258	2
Peritonsillar abscess, incision.....	50	5
Retropharyngeal abscess, incision.....	1	.....
Tonsillectomy.....	481	67
Uvulectomy.....	3	.....
Minor.....	3	.....
Removal of tumor from tongue.....	1	.....
Reduction fractured malar bone.....	1	.....
Larynx:		
Abscess, incision.....	1	.....
Foreign body, removal.....	3	3
Intubation.....	2	.....
Passing of esophageal longie.....	1	.....
Trachea:		
Foreign body, removal.....	2	.....
Tracheotomy.....	.....	2
Totals.....	1,479	235
Refractions.....	1,406	.....

TABLE XX.—REPORT OF X-RAY DEPARTMENTS, ANCON AND SANTO TOMAS HOSPITALS.

	Ancon Hospital.	Santo Tomas Hospital.
Nature of examinations:		
Arm.....	70	193
Arm and forearm.....	72	117
Chest.....	255	328
Dental.....	413	.....
Elbow.....	77	53
Fluoroscopy.....	25	.....
Foot and ankle.....	240	41
Foreign body.....	14	.....
Urinary bladder.....	63	.....
Gastro-intestinal tract.....	83	.....
Hand.....	224	.....
Head.....	75	36
Hip.....	50	91
Intestines.....	.....	36
Jaw.....	63	65
Kidney.....	24	98
Knee.....	95	76
Leg.....	97	75
Liver and gall bladder.....	34	40
Lung.....	7	1
Pelvis.....	33	28
Neck.....	3	26
Shoulder.....	104	91
Sinuses.....	86	.....
Spine.....	70	.....
Stomach.....	66	251
Thigh.....	14	21
Treatment.....	56	604
Vertebra.....	.....	34
Wrist.....	114	52
Mastoids.....	36	.....
Heart.....	6	23

CLASSIFICATION OF X-RAY PLATES USED.

6 x 8.....	631	109
8 x 10.....	1,352	495
10 x 12.....	1,931	345
11 x 14.....	.....	117
14 x 17.....	803	419
Dental films.....	1,612	324
6½ x 8½.....	520	.....
X-ray films, 8 x 10.....	50	.....
X-ray films, 14 x 17.....	31	.....

TABLE XXI.—SANTO TOMAS HOSPITAL.

PATIENTS TREATED.

Class.	Remaining Dec. 31, 1920.	Admit- ted.	Died.	Dis- charged.	Remaining Dec. 31, 1921.
Pay cases.....	28	1,082	53	1,036	21
Charity cases.....	343	7,697	696	7,065	279
Total.....	371	8,779	749	8,101	300

Class.	Number treated.	American.		Other nations.	
		White.	Black.	White.	Black.
Pay cases.....	1,110	15	.....	504	591
Charity cases.....	8,040	13	.....	1,264	6,763
Totals.....	9,150	28	.....	1,768	7,354

Number of days relief furnished patients.....	124,438
Average number of patients constantly sick.....	344
Average number of days treatment for each patient admitted.....	9

DISPENSARY REPORT.

Class.	White.	Black.	Total.
Natives treated.....	2,219	4,194	6,413
Foreigners treated.....	463	2,212	2,675
Totals.....	2,682	6,406	9,088

TABLE SHOWING NUMBER OF DISCHARGES AND DEATHS.

	Dis- charged.	Died
Typhoid fever.....	4	1
Malaria.....	301	12
Malarial fever, estivoautumnal.....	42	2
Malarial fever, tertian.....	5	
Malarial fever, clinical.....	11	
Smallpox.....	13	
Measles.....	137	
Scarlet fever.....	3	1
Whooping cough.....	2	1
Diphtheria and croup.....	67	7
Influenza.....	131	6
Dysentery.....	69	5
Dysentery, entamebic.....	8	5
Leprosy.....	1	
Dengue.....	5	
Chickenpox.....	10	
German measles.....	33	
Hemoglobinuric fever, unqualified.....	3	
Purulent infection and septicemia.....	42	
Pyemia.....	71	13
Mycosis.....	1	6
Beriberi.....	4	7
Tuberculosis of the lungs.....	6	1
Acute miliary tuberculosis.....	84	144
Tuberculous meningitis.....	2	6
Abdominal tuberculosis.....	1	1
White swellings.....	4	
Tuberculosis of bones and joints.....	2	
Tuberculosis of the larynx.....	10	2
Tuberculosis of the genito-urinary organs.....	1	
Rickets.....		1
Syphilis, primary.....	1	
Syphilis, secondary.....	25	1
Syphilis, tertiary.....	6	
Syphilis, cerebro-spinal.....	450	22
Syphilis, hereditary.....		1
Gonococcus infection.....	339	1
Gonorrhea.....	115	
Gonorrheal arthritis.....	91	1
Soft chancre.....	143	
Adenitis chancroidal.....	37	
Cancer and other malignant tumors of the buccal cavity.....	1	3
Cancer and other malignant tumors of the stomach, liver, esophagus and pharynx.....	5	8
Cancer and other malignant tumors of the peritoneum, intestines, and rectum.....	4	6
Cancer and other malignant tumors of the female genital organs.....	24	3
Cancer and other malignant tumors of the breast.....	4	1
Cancer and other malignant tumors of the skin.....	6	
Cancer and other malignant tumors of other organs and of organs not specified.....	8	4
Other tumors.....	19	1
Acute articular rheumatism.....	11	
Chronic rheumatism and gout.....	15	
Diabetes.....	1	1
Leukemia.....	2	2
Anemia, chlorosis.....	2	1
Anemia, secondary, cause not determined.....	1	
Other general diseases.....	13	
Alcoholism.....	47	1
Other chronic poisonings.....	1	
Simple meningitis.....	1	7
Locomotor ataxia.....	4	
Other diseases of the spinal cord.....	4	
Cerebral hemorrhage, apoplexy.....	12	5

TABLE SHOWING NUMBER OF DISCHARGES AND DEATHS.—Continued.

	Dis- charged.	Died.
Softening of the brain.....	1	1
Paralysis without specified cause.....	6	1
General paralysis of the insane.....	1	1
Other forms of mental alienation.....	26	
Dementia precox.....	5	
Epilepsy.....	28	1
Convulsions, nonpuerperal.....	1	
Convulsions of infants.....	1	
Hysteria.....	7	
Neuralgia.....	2	
Neuritis.....	14	
Other diseases of the nervous system.....	11	
Organic disease of the brain.....	3	
Diseases of the eyes and their annexa.....	80	
Diseases of the ears.....	8	
Acute endocarditis.....		1
Organic diseases of the heart.....	53	40
Angina pectoris.....	4	1
Diseases of the arteries, atheroma, etc.....	10	5
Arteriosclerosis.....		1
Embolism and thrombosis.....	2	
Diseases of the veins.....	37	2
Diseases of the lymphatic system.....	178	1
Hemorrhage; other diseases of the circulatory system.....	4	6
Diseases of the nasal fossae.....	15	
Diseases of the larynx.....	1	
Diseases of the thyroid body.....	23	
Acute bronchitis.....	86	2
Chronic bronchitis.....	39	
Broncho-pneumonia.....		30
Lobar pneumonia.....	62	60
Pleurisy.....	32	1
Empyema.....	3	
Pulmonary congestion, pulmonary apoplexy.....		4
Gangrene of the lungs.....	10	2
Asthma.....	8	
Other diseases of the respiratory system.....	2	1
Hay fever.....	2	
Diseases of the mouth and annexa.....	25	
Diseases of the teeth and gums.....	4	
Diseases of the pharynx.....	44	
Follicular tonsillitis.....	59	2
Ulcer of the stomach.....	5	
Other diseases of the stomach.....	37	
Diarrhea and enteritis, under 2 years.....	30	25
Diarrhea and enteritis, 2 years and over.....	39	7
Colitis, 2 years and over.....		3
Ankylostomiasis.....	225	
Intestinal parasites.....	79	
Appendicitis and typhlitis.....	216	
Hernia, intestinal obstructions.....	179	4
Other diseases of the intestines.....	23	1
Constipation.....	30	2
Duodenal ulcer.....	12	1
Cirrhosis of the liver.....	11	2
Biliary calculi.....	3	
Other diseases of the liver.....	46	3
Abscess of the liver, entamebic.....	1	8
Diseases of the spleen.....	5	1
Simple peritonitis, nonpuerperal.....	4	12
Acute nephritis.....	5	2
Bright's disease (chronic nephritis).....	139	84
Chyluria.....	2	
Other diseases of the kidney and annexa.....	9	
Movable kidney.....	1	

TABLE SHOWING NUMBER OF DISCHARGES AND DEATHS.—Continued.

	Dis- charged.	Died.
Pyelo-nephrosis.....	1	..
Calculi of the urinary passages.....	2	..
Diseases of the bladder.....	40	..
Cystitis.....	2	..
Diseases of the urethra, urinary abscess, etc.....	33	1
Stricture of the urethra, nonvenereal.....	51	..
Diseases of the prostate.....	9	..
Nonvenereal diseases of the male genital organs.....	49	..
Uterine hemorrhage, nonpuerperal.....	3	..
Uterine tumor, noncancerous.....	51	5
Other diseases of the uterus.....	120	1
Cysts and other tumors of the ovary.....	16	1
Salpingitis and other diseases of the female genital organs.....	170	1
Nonpuerperal diseases of the breast, cancer excepted.....	3	..
Normal labor.....	838	..
Accidents of pregnancy.....	173	3
Abortion.....	14	1
Puerperal hemorrhage.....	6	..
Other accidents of labor.....	12	1
Puerperal septicemia.....	1	..
Puerperal albuminuria and convulsions.....	5	4
Eclampsia.....	2	..
Following childbirth, not otherwise defined.....	5	..
Puerperal diseases of the breast.....	2	..
Gangrene.....	11	4
Furuncle.....	13	2
Acute abscess.....	148	..
Scabies.....	14	..
Ulcer of the skin.....	238	..
Diseases of the bones, tuberculosis excepted.....	23	2
Diseases of the joints, tuberculosis and rheumatism excepted.....	25	1
Other diseases of the organs of locomotion.....	10	1
Congenital malformations.....	58	2
Newborn child.....	803	..
Icterus and sclerema.....	..	82
Other causes peculiar to early infancy, including various consequences of labor.....	3	8
Lack of care.....	2	..
Senility.....	2	1
Suicide.....	..	1
Poisoning by food.....	2	..
Other acute poisonings.....	12	..
Venomous bites and stings.....	2	..
Conflagration.....	..	1
Burns, conflagration excepted.....	23	2
Absorption of deleterious gases, conflagration excepted.....	1	..
Traumatism by firearms.....	49	4
Traumatism by cutting or piercing instruments.....	88	1
Traumatism by fall.....	18	2
Traumatism by machines.....	6	..
Traumatism by other crushings.....	9	..
Injuries by animals.....	1	1
Fractures, cause not specified.....	96	3
Sprains.....	8	..
Other external violence.....	124	3
Infections of undetermined origin.....	8	3
No disease.....	233	..

TABLE XXII.—COROZAL HOSPITAL—STATEMENT OF COMMITMENTS AND DISCHARGES.

COMMITMENTS.

	Male.	Female.
From Canal Zone:		
First admission.....	79	32
Second admission.....	6	3
Third admission.....	2	
From Panama Government:		
First admission.....	36	42
Second admission.....	11	12
Third admission.....	1	1
Fourth admission.....	1	1
Totals.....	136	91

DISCHARGES.

	Well.		Improved.		Unimproved.	
	Male.	Female.	Male.	Female.	Male.	Female.
Barbados.....	3	1				
Colombia.....	1	1			1	
China.....	3				1	
Costa Rica.....		1				
England.....				3		
Finland.....	1					
Germany.....					1	
Guadeloupe.....	1					
Haiti.....			1			
India.....			1			
Jamaica.....	4	3	4	4	5	6
Martinique.....	2	4	1	3	1	
Panama.....	6	13	4	5	4	7
Peru.....	2		1			
Porto Rico.....		1			2	
Russia.....					1	
Scotland.....					1	
Slovakia.....					2	
Spain.....			2		1	
St. Thomas.....			1	1		
St. Lucia.....	1	1				
Sweden.....			1			
Trinidad.....			1		2	1
United States.....	8		15	3	19	2
Venezuela.....			1			
Totals.....	32	25	33	19	41	16

TABLE XXIII.—FORCE REPORT.

	December 31, 1921.			1920.	1919.
	Gold.	Silver.	Total.		
Chief Health Office.....	3	.....	3	3	3
Medical Storehouse.....	4	4	8	8	8
Quarantine Service.....	10	25	35	44	47
Health Office, Panama.....	10	145	155	121	164
Health Office, Colon.....	8	86	94	159	173
Ancon Hospital.....	121	208	329	360	368
Colon Hospital.....	22	34	56	60	55
Santo Tomas Hospital.....	7	.....	7	7	6
Palo Seco Leper Colony.....	1	30	31	50	40
Zone sanitation.....	4	112	116	143	223
Corozal Hospital and farm.....	17	87	104	98	113
Dispensaries.....	12	8	20	19	16
Totals.....	219	739	958	1,072	1,216

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